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PUBLIC HEALTH REPORTS.

By

JOHN SIMON, C.B., F.R.S., &c.

Edited for

THE SANITARY INSTITUTE OF GREAT BRITAIN

by

EDWARD SEATON, M.D. Lond., F.R.C.P.,

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VOL. I.

CITY OF LONDON REPORTS.
HISTORY AND PRACTICE OF VACCINATION.
THE SYSTEM OF PUBLIC VACCINATION IN ENGLAND.
LONDON CHOLERA EPIDEMICS OF 1848-9 AND 1853-4.
SANITARY STATE OF THE PEOPLE OF ENGLAND.
PAPERS RELATING TO THE CONSTITUTION OF THE MEDICAL PROFESSION, AND TO THE OPERATION OF THE MEDICAL ACT, 1858.
THE PRACTICE OF PHARMACY IN GREAT BRITAIN.

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PREFACE.

THE publication by the Council of the Sanitary Institute of an abstract of the works of the late Dr. W. Farr having been approved by the sanitary and scientific world, it has been thought that the Institute would be following its legitimate line of action if it popularised the work of another highly distinguished pioneer in Sanitary Science and Preventive Medicine.

Mr. John Simon's claims as an author of classical sanitary literature are thoroughly established by a general consensus of opinion among those who have studied the subject. The recognition of the labours of Mr. Simon by the State have been of the most meagre kind (as was the case with Dr. Farr). He had not allowed himself to be drawn into the vortex of political life, and was not therefore of political value to the party who happened, whilst he held office at the Local Government Board, to be holding the reins of Government in this country.

Mr. Simon by his magnificent labours pointed out the way to effect an enormous saving of life in our great cities, among our manufacturing people, as well as in our rural districts. It appeared to the Council of the Sanitary Institute that this author of axioms now universally accepted, may possibly be forgotten by the outside world, because his works are entombed in a mass of blue books, and in reports not very easy of access to the student of to-day.

The Council of the Sanitary Institute, believing that abstracts revised by the author himself would be more satisfactory than a publication made after his removal from among us, instructed the Sanitary Publication Committee to inquire as to the possibility of securing Mr. Simon's assistance, and to ask if such a publication would be agreeable to his own feelings.

Mr. Simon met the suggestion of the Council in his usual manner of self-abnegation. He cordially agreed to the proposal, undertaking to examine the arrangements, and suggesting that Dr. Edward Seaton should be appointed Editor, with the understanding that he (Mr. Simon) was prepared to advise him as to the plan of the reprint, which plan was to be subject to his (Mr. Simon's) approval.

The Council at once adopted Mr. Simon's suggestion, believing that Dr. Seaton's high position as a distinguished sanitarian would be a guarantee for the fidelity of the work.

An inquiry was then made among those interested in the fields of Mr. Simon's labours as to the amount of support that such a publication would be likely to obtain. The Committee soon had the gratifying result that it would be enthusiastically received by those who had already recognised the true value of Mr. Simon's services.

As was stated in the Prospectus which was issued by the Institute : " The work which Mr. Simon has performed (like that of Dr. Farr) " is fundamental. It has assisted materially to promote the success " which in recent years has attended the action of Sanitary " Authorities, viz., limiting the extension of all kinds of disease. " His writings, like those of Dr. Farr, are distributed in a mass " of blue books and reports, several of which are out of print, " and they are not in a form which can be easily consulted by the " student. Many of the papers are of immense importance at " this juncture, when various social questions, connected with the " housing of the poor and the occupations and feeding of the " people, are coming into the field of practical politics."

The writer of this Preface understands that the abstracts are complete in themselves, but they refer to other matter which is to be hoped may be also republished at any early date. It has been impossible to bring all the material at command in review, and some must not be condensed. If possible the appendices to which references are made should be republished, and a further volume containing this important matter is to be desired.

Those personally acquainted with Mr. Simon, when he was actively at work in the City of London, will recognise the truthfulness of the

artist in the portrait which is appended to the first volume, whilst that placed in the second gives the likeness of the man on his retirement from active labour, when he had endeared himself to the students of St. Thomas's Hospital, as the personal friend and adviser of every working man among their numerous body, which at that time included the writer of this Preface, and who has acted as Chairman of the Sanitary Publication Committee.

N.B.—Since this Preface was written Her Majesty's Jubilee has been celebrated, and the Queen has been graciously pleased to recognise Mr. Simon's claims to distinction, and to confer upon him the honour of K.C.B.

NOTE BY THE EDITOR.

Dr. Carpenter has fully explained the conditions under which I undertook to edit for the Sanitary Institute "the remarkable series of reports" of Mr. (now Sir) John Simon, "which had so large an effect in shaping "professional and public opinion in sanitary matters in England and "abroad" (*vide* Report for 1876 of the Medical Officer of the Local Government Board, the late Dr. Seaton). It is, therefore, only necessary for me to add, by way of preface to their re-publication, a few words of further explanation.

The choice and arrangement of the reprinted writings has been entirely subject to Mr. Simon's approval, and in order to obtain the full advantage of his advice, and generally to carry out the work in accordance with his wishes, it has been necessary to devote a long period to the preparation of these volumes.

It has already been stated in the circular issued by the Sanitary Institute, inviting subscriptions for the work, that it is virtually a *Reprint* of Mr. Simon's reports and writings on Public Health. The revision of the proof sheets by Mr. Simon himself has been for the purpose of giving clearer expression to his original meaning in certain passages of his writings, and not for the purpose of altering his arguments, opinions, or advice, which were founded upon the existing state of knowledge at the time when his famous reports appeared. There is one exception to this general rule. In his celebrated essay on the History and Practice of Vaccination, which is reprinted in Volume I., there are important notes, written by himself in 1887, at pages 234 and 275, to which attention is drawn.

The separate publication of Mr. Simon's reports makes it necessary that some explanation should be given of the references in each report to the Appendix to the Report, for without such explanation the reader would be unable to understand the meaning of the references in these books. The Reports of their Medical Officer were published by the Government in volumes, each containing the Medical Officer's own report, followed by an Appendix. The Appendices include reports of the greatest interest and importance, written by men whose names are famous as among those of the founders of Sanitary Science, and who are generally acknowledged in the medical profession to have rendered splendid services to the public. There has been no thought at present of making any other reference to these works than that which appears in Mr. Simon's own reports, and as it has been impossible to sever these references from the context, I have generally made a mark, thus [A], wherever a reference is made to an Appendix to the Privy Council and Local Government Board Reports, which does not appear. Occasionally, for convenience, the reference remains as in the original reports.

It must be further explained that the few official documents and writings which have been taken out from the Appendices of the Government volumes, and inserted in these volumes, are of Mr. Simon's own writing, and therefore belong to him. These appear in small type, and are appended to the sections devoted to the "System of "Public Vaccination in England," "The Constitution of the Medical "Profession," "The Privy Council Reports, Nos. 8, 9," "The Local "Government Board Reports, 1874."

The Table of Contents to each volume is very complete, and is intended to serve as an Index.

EDWARD SEATON.

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CITY OF LONDON REPORTS.

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CITY OF LONDON REPORTS.

[The official *Years* to which the City Annual Reports related were successive terms of 52 weeks, each term running from Michaelmas to Michaelmas.

The following Extracts are grouped by the Editor under general headings descriptive of their subject-matter, and under each general heading the Extracts stand in order of the years.—Ed.]

HOUSE DRAINAGE.

[On matters of House-Drainage and Water-Supply, Mr. Simon started on lines previously indicated by Mr. Chadwick and the Health of Towns Commission; and, in paying tribute to the indomitable zeal and perseverance of Mr. Chadwick, he dwelt upon the extremely injurious effects of the cesspool nuisance, and insisted on house-drainage with effective water-supply as the remedies which could alone avail the City. His Report of 1874 on "Filth-Diseases and their Prevention," embodied the results of a quarter of a century's further experience, and showed that other dangers to health arose where the water-carriage system had been ineffectively or improperly applied.—Ed.]

Mr. Chadwick and the Health of Towns Commission.

From First Annual Report, dated November 6th, 1849.

It is not in my power to lay before you any numerical statement of the proportion of drained to undrained houses. From such information as I possess, I may venture to speak of imperfect house-drainage as having been a general evil in all the poorer districts of the City; and the latest intelligence on the subject leads me to consider this great evil as but very partially removed. So far as I can calculate from very imperfect materials, I should conjecture that some thousands of houses within the City still have cesspools connected with them. It requires little medical knowledge to understand that animals will scarcely thrive in an atmosphere of their own decomposing excrements; yet such

Imperfection of house-drainage.

Dangers arising from cesspools under houses.

strictly and literally speaking, is the air which a very large proportion of the inhabitants of the City are condemned to breathe. Sometimes, happily for the inmates, the cesspool in which their ordure accumulates, lies at some small distance from the basement-area of the house, occupying the subsoil of an adjoining yard, or if the privy be a public one, of some open space exterior to the private premises. But in a very large number of cases, it lies actually within the four walls of the inhabited house; the latter reared over it, as a bell-glass over the beak of a retort, receiving and sucking up incessantly the unspeakable abomination of its volatile contents. In some such instances, where the basement story of the house is tenanted, the cesspool lies—perhaps merely boarded over—close beneath the feet of a family of human beings, whom it surrounds uninterruptedly, whether they wake or sleep, with its fetid pollution and poison.

Now, here is a removable cause of death. These gases, which so many thousands of persons are daily inhaling, do not, it is true, in their diluted condition, suddenly extinguish life; but, though different in concentration, they are identically the same in nature with that confined sewer-gas which, on a recent occasion, at Pimlico, killed those who were exposed to it with the rapidity of a lightning stroke. In their diluted state, as they rise from so many cesspools, and taint the atmosphere of so many houses, they form a climate the most congenial for the multiplication of epidemic disorders, and operate beyond all known influences of their class in impairing the chances of life.

It may be taken as an axiom for the purposes of sanitary improvement, that every individual cesspool is hurtful to its vicinage; and it may hence be inferred how great an injury is done to the public health by their existence in such numbers, that parts of the City might be described as having a cesspool-city excavated beneath it.

I beg most earnestly to press on the consideration of your Hon. Court, the extreme importance of proceeding with all convenient speed to alter this very faulty construction, and to substitute for it an arrangement compatible with the health of the population.

While addressing you on this subject, and while congratulating your Hon. Court on the fact, that public attention is so much directed to a matter in which your exertions are certain to effect large and salutary reform, I cannot refrain from expressing a wish, that more accurate knowledge prevailed among the public as to the history and jurisdiction of the nuisance in question. It seems constantly to be forgotten, that your responsibility in the matter dates but from last January. The cesspool-nuisance has been the slow growth of other less enlightened ages, not in the City merely, but in the whole metropolis, and in all other towns in England. The extreme injury which it inflicts on the health of the population, and the vital necessity of abating that injury, are points which only began to claim attention in this country about ten years ago; and which have since but very slowly been forcing their way (chiefly through the indomitable zeal and perseverance of Mr. Chadwick) into that share of notice which they deserve. House-drainage with effective water-supply, are the remedies which can alone avail; and it is only during the present year that authority to enforce these measures has been vested by the Legislature in any public bodies whatsoever.

Remedy for the cesspool-nuisance.

House drainage with effective water supply.

Before the month of January last, when your increased jurisdiction was established, it appears to me that, for the existence of cesspools in the City, you had no more responsibility than for the original site of the metropolis, or for the architecture of Westminster Abbey.

During the last ten months, however, the care of effective house-drainage has rested solely and entirely with your Hon. Court; for two of those ten months, I thought it desirable, on account of the epidemic, that no considerable disturbance of the soil should take place in the construction of new works; in the remaining eight months, two miles of new sewer were formed, and 900 houses were drained for the first time.

If the house-drainage of the City had depended for its completion, even since that time, solely on the labours of this Commission, no doubt it would have proceeded at a far quicker pace. How effectively your Hon. Court had pre-

pared for the best application of your increased powers, is sufficiently evinced in the 45 miles of sewerage, ramifying through all the districts of your jurisdiction, ready at every point to receive the streams of private drainage, and leaving to the owners of house-property (with few exceptions) no excuse for their non-performance of these necessary works.

Sewerage of the City.

I believe the extent of public sewerage within the City to be quite unparalleled, and to furnish facilities of the rarest kind for the abolition of cesspools, and for the establishment of an improved system of house-drainage. But, Gentlemen, while you have exerted yourselves to the utmost in the application of your increased authority, and have directed your staff of officers, from first to last, to proceed with all possible despatch in enforcing sanitary improvement in the matter now under consideration, the intentions of your Court and the industry of its officers have been in a great measure frustrated by the passive resistance of landlords. Delays and subterfuges have been had recourse to by the owners of house-property, in order to avoid compliance with the injunctions of the Commission; and the temporary interruption of works, which occurred in August and September, prevented these evasions from being dealt with as otherwise they would have been.

Now, however, the course is again open. For some weeks your Hon. Court has directed that all works of drainage and sewerage shall proceed,—many are already in progress,—and I can see no reason why, within a year from the present time, the number of cesspools and of undrained houses within the City of London should not be reduced to a very small proportion.

Obstructiveness of landlords.

Everything, however, in this respect will depend on the spirit of *thoroughness* with which the Act of Parliament is enforced; and I would strongly recommend, in all cases of non-drainage or other non-compliance with the terms of notice, that no indulgence whatever should be conceded to landlords beyond the time specified in the notification of the Court; that no difference should be recognised between a "notice" and "a peremptory notice;" that all notices should be "peremptory;" and that, a certain period for performance

having been allowed to the landlord, on the very day of that period's expiration, the work, if undone, should be given over for completion by the workmen of the Commissioners of Sewers, in accordance with the 61st clause of the Act of Parliament. In favour of the adoption of this principle, I can adduce no stronger argument than my conviction, that its non-adoption would insure a sacrifice of human life, in exact proportion to the procrastination allowed; and that, too, in a matter where henceforth your responsibility is undivided and your power absolute.

In order to give efficiency to whatever improvements of house-drainage may be instituted, the present system of water supply will require to undergo very extensive modifications; for at present, in the poorer tenements, even where some show of house-drainage is made, the arrangements are constantly rendered inoperative from insufficiency or absence of water. To this matter, however, I shall presently revert.

Trapping and ventilation of sewers.

Another most important *desideratum* in connexion with the sewerage of the City is that, if possible, some more perfect system of trapping should be devised, or that, in some way or other, the sewers should be ventilated effectively and inoffensively. At present there are frequent complaints of offensive exhalation from gratings in the open ways of the City; and it will be obvious to your Hon. Court, that all which I have urged on the subject of cesspool-exhalations must apply equally to those which are emitted from sewers. The impediments to effective trapping are almost insuperable; but I believe that when the water supply of the City is very largely increased, washing the drains amply and incessantly, the evil complained of will undergo a sensible diminution.

In further connexion with my present subject, I would also solicit attention to the fact that the sanitary purposes of drainage are but imperfectly achieved, where the outfall of sewerage is into a tidal river passing through the heart of a densely peopled metropolis. I should be stepping beyond my province, if I were to say much respecting the schemes now before the public for dealing with the difficulty to which I

here refer, inasmuch as those schemes involve questions of engineering and machinery, on which I am incompetent to form an opinion. But I can have no hesitation in stating it as a matter greatly to be desired in the City of London, that the noble river which ebbs and flows beneath its dwellings should cease to be the drainpool of our vast metropolis; and that the immeasurable filth which now pollutes the stream should be intercepted in its course, and be conveyed to some distant destination, where instead of breeding sickness and mortality, it might become a source of agricultural increase and national wealth.

Pollution of the Thames.

I would venture, likewise, to express an opinion that the City of London is peculiarly interested in the accomplishment of this great public work, not only on general grounds relating to the conservancy of the river, but likewise and especially on sanitary grounds, by reason of the large bank-side population, subjects of the City, who now, instead of deriving advantage from their nearness to the stream, are constantly disgusted and injured by its misuse.

While the consideration of this most important measure is pending, I would invite attention to some circumstances, by which even the present evil is needlessly aggravated.

River banks at ebb of tide.

In the first place the sewers are of defective length, so that during the ebb of the tide their contents, as they escape, are suffered to flow in a stream of some length across the mud of the retreating river. The stream, together with the mud which it saturates, and the open mouth of the sewer, evolve copious and offensive exhalations, and I would recommend that measures be taken for abatement of the nuisance. This purpose, as concerns the sewer, would be fulfilled by the addition, in each instance, of a sufficient length of brick or cast-iron work, to prolong the canal beyond low water mark; but the great extent of mud which is left uncovered at each tide, and which during the present pollution of the river is a source of extreme nuisance and of disease, constitutes an evil for which no remedy can be found till the stream shall be narrowed and embanked.

Nuisance from the river docks.

Meanwhile, the complaints which reached the Committee of Health during the summer, together with the results of my

own inspection, lead me to believe that the several small docks which lie along the City bank of the river from the Tower to the Temple, fulfil little really useful purpose; that they are to a great extent used as laystalls for their vicinage; that copious deposits and accumulations of filth take place in them; that they are a nuisance and injury, except to the very few who are interested in their maintenance; and that it would be of public advantage that they should be filled up.

WATER SUPPLY.

From First Annual Report.

I am sure that I do not exaggerate the sanitary importance of water, when I affirm that its unrestricted supply is the first essential of decency, of comfort, and of health; that no civilization of the poorer classes can exist without it; and that any limitation to its use in the metropolis is a barrier, which must maintain thousands in a state of the most unwholesome filth and degradation.

Defective water supply.

In the City of London the supply of water is but a fraction of what it should be. Thousands of the population have no supply of it to the houses where they dwell. For their possession of this first necessary of social life, such persons wholly depend on their power of attending at some fixed hour of the day, pail in hand, beside the nearest standcock; where, with their neighbours, they wait their turn —sometimes not without a struggle, during the tedious dribbling of a single small pipe. Sometimes there is a partial improvement on this plan; a group of houses will have a butt or cistern for the common use of some scores of inmates, who thus are saved the necessity of waiting at a standcock, but who still remain most insufficiently supplied with water. Next in the scale of improvement we find water-pipes laid on to the houses; but the water is turned on only for a few hours in the week, so that all who care to be adequately supplied with it must be provided with very spacious receptacles. Receptacles are sometimes provided: and in these, which are often of the most objectionable

Objections to intermittent water supply.

description, water is retained for the purposes of diet and washing, during a period which varies from twenty-four to seventy-two hours. One of the most important purposes of a water-supply seems almost wholly abandoned—that, namely, of having a large quantity daily devoted to cleanse and clear the house-drains and sewers; and in many cases where a waste-pipe has been conducted from the water-butt to the privy, the arrangement is one which gives to the drainage little advantage of water, while it communicates to the water a well-marked flavour of drainage.

I consider the system of intermittent water-supply to be radically bad; not only because it is a system of stint in what ought to be lavishly bestowed, but also because of the necessity which it creates that large and extensive receptacles should be provided, and because of the liability to contamination incurred by water which has to be retained often during a considerable period. In inspecting the courts and alleys of the City, one constantly sees butts, for the reception of water, either public, or in the open yards of the houses, or sometimes in their cellars; and these butts, dirty, mouldering, and coverless; receiving soot and all other impurities from the air; absorbing stench from the adjacent cesspool; inviting filth from insects, vermin, sparrows, cats, and children; their contents often augmented through a rain water-pipe by the washings of the roof, and every hour becoming fustier and more offensive. Nothing can be less like what water should be than the fluid obtained under such circumstances; and one hardly knows whether this arrangement can be considered preferable to the precarious chance of scuffling or dawdling at a standcock. It may be doubted, too, whether, even in a far better class of houses, the tenants' water supply can be pronounced good. The cisternage is better, and all arrangements connected with it are generally such as to protect it from the grosser impurities which defile the water-butts of the poor; but the long retention of water in leaden cisterns impairs its fitness for drinking; and the quantity which any moderate cistern will contain is very generally insufficient for the legitimate requirements of the house during the intervals of supply.

Every one who is personally familiar with the working of this system of intermittent supply can testify to its inconvenience; and though its evils press with immeasurably greater severity on the poor than on the rich, yet the latter are by no means without experience on the subject.

The following are the chief conditions in respect of water supply, which peremptorily require to be fulfilled:—

1. That every house should be separately supplied with water, and that where the house is a lodging-house, or where the several floors are let as separate tenements, the supply of water should extend to each inhabited floor.

2. That every privy should have a supply of water, applicable as often as it may be required, and sufficient in volume to effect, at each application, a thorough flushing and purification of the discharge-pipe of the privy.

3. That in every court, at the point remotest from the sewer-grating, there should be a standcock for the cleansing of the court; and

4. That at all these points there should always and uninterruptedly be a sufficiency of water to fulfil all reasonable requirements of the population.

Water supply for the City.

Now, if my statements are accurate with regard to the imperfect manner in which thousands participate in the distribution of water, even for their personal necessities; if my statements are again accurate with respect to house-drainage, and to the immense increase of water distribution which must accompany any improvement in this respect—and I am quite prepared, if necessary, to adduce ample evidence on these subjects; if, again, it be considered that the appreciation of water by the multitude, who have so long suffered from lack of it, will lead to a vast augmentation of its domestic use; then, I apprehend, it cannot be doubted that the subject of water-supply to the City is one that requires now to be looked at almost as though it were to-day broached for the first time.

Those important conditions, which I just enumerated as urgently requiring fulfilment, may certainly be accomplished, so far as mechanical construction is concerned, in more than one way. It may be possible, no doubt, in further com-

pliance with the principle of intermittent supply, to furnish every tenement in the City with a cistern of proper dimensions, and with its usual appurtenances of ballcock, waste-pipe, &c.; but this, I need hardly say, would be a process involving a vast expenditure of money, and hardly to be recommended on the mere ground of conformity with what has hitherto been done in the matter. It may be possible, on the other hand, to convert the whole water-supply of the City into a system of uninterrupted supply, and to construct all new works in conformity with this system.

I beg to suggest that the choice between these alternatives is one of immense and very urgent importance to the sanitary welfare of the City; and I would earnestly commend it to the best consideration of your Hon. Court.

Towns in which constant supply adopted.

The system of a constant supply is now no longer a novelty. In Philadelphia, in New York, in Nottingham, in Preston, in Glasgow, in Newcastle, in Bristol, and in various other places, this system has been adopted; its practicability and its advantages have been amply demonstrated.* Five years ago, when evidence on the subject was given before the House of Commons, it appeared that in the city and suburbs of Philadelphia 25,816 houses were supplied at an average rate of five dollars per house; that in Preston more than 5,000 houses were supplied continually at high-pressure, and that the company was increasing its tenants at the rate of 400 annually; that in Nottingham about 8,000 houses, containing a population of 35,000 persons, were supplied in the same manner; and in respect of many other towns, public experience has been equally extensive and satisfactory. About a month ago, the Sanitary Committee of the last-mentioned town published what I may call a

Nottingham water supply.

* It seems almost unnecessary to remind the reader that five more years have added infinite additional testimony to that mentioned in the text as existing in 1849; and that, two years ago, in a special Act of Parliament, it was enjoined on the Water Companies of the Metropolis that, within seven years, they should follow the precedent so extensively established. In the face of such evidence—with the knowledge that Manchester has a constant supply and that Glasgow is arranging one, it certainly tests one's credulity to hear it rumoured that our Metropolitan Water-Merchants are hoping to resist that requirement, on the ground that such a supply in London would be *impossible*.—J.S., 1854.

report of congratulation on their freedom from cholera, which had visited the town with great severity in 1832. They detail the measures by which Nottingham has been rendered a healthy town, and the first item in that enumeration stands thus:—"An unlimited supply of wholesome "filtered water, forced, by day and night, at high pressure, "through all the streets to the tops of almost all the houses, "at a cost, for the dwellings of the poor, of about five "farthings per week."

On the relative merits or demerits of the two competing systems of supply, I have only to speak so far as their adaptation to sanitary purposes is concerned. In this respect, I have no hesitation in saying that the system of constant supply is immeasurably superior to its rival; so superior, that unless competent engineering authorities should decide on its practical inapplicability to the City of London, I would strongly recommend its adoption as the only one, in my judgment, by which the growing necessities of the population can be fully and effectively satisfied.

From Second Annual Report, dated November 26th, 1850.

During the past year, as in the preceding one, I have given frequent consideration to the subject of water-supply within the City.

Water supply for the City.

I have already endeavoured to convey to you the deep sense which I entertain of its importance, and I have every reason to believe that your Hon. Court recognises, at its full weight, the necessity of providing for the City of London a supply of water which in quantity shall be ample, in quality pure, in distribution constant and accessible.

In my former Annual Report, and in some remarks subsequently addressed to your Committee of Health, I dwelt especially on such defects of our present system as relate to the quantity and distribution of water; endeavouring to illustrate the insufficiency of its supply to the poorer tenements of the City, and the extreme inconvenience which is

entailed on their inmates, sometimes by dependence on a common tap, sometimes by the troublesome, expensive, and unwholesome necessity of storing water.

In reverting to this subject, I may correct a fallacy which is apt to prevail with respect to the abundance of supply. I have no reason whatever to doubt that a very liberal allowance of water is daily pumped into the City—enough, or more than enough, so far as I know, to fulfil all necessary purposes.

Water supply per head.

But those purposes are not fulfilled by it. A certain large figure is stated as representing the average quantity daily driven through the mains of the City; this quantity is divided by the number of residents within your area, and the inference is drawn that each individual inmate of the City has at his disposal 25 gallons a day; or (after deduction for public purposes and the like) 21¼ for his domestic supply. As an arithmetical conclusion from the premises this may be true: nothing can be less accurate as a practical representation of the facts. An average amount of three million gallons *per diem* may, or may not, be pumped through the mains of the City: but to calculate the *available water-supply* from this dividend, without previous deduction for the immense escape of *un-available water* by waste-pipes or otherwise, gives a most fictitious result. The large waste which naturally arises in the system of intermittent supply has been well illustrated by some evidence given by Mr. Lovick before the late Metropolitan Commission of Sewers, in respect of a particular block of nearly 1200 houses.* Some of the houses were of the higher, and many of the poorer class, but the average might be stated to be of the middle class, and to present a fair example of an urban population. The drainage of all these houses was discharged through one main sewer. The run of water through this sewer was carefully watched and gauged every hour, during the night as well as the day, on days when the water was on, that is to say, when the

Waste of water on intermittent system.

* General Board of Health Report on Supply of Water to the Metropolis, page 120.

intermittent supplies were delivered, and also on the ordinary days, when the consumption of the houses was from butts and cisterns, into which the intermittent supplies were delivered. The gaugings of the discharge of waste water into the sewer were checked by gaugings of the consumption of water from the butts and cisterns, during the interval of the delivery of the supply by the company. It was ascertained that the average quantity discharged *per diem* through the sewers was 44½ gallons per house; but it appeared that, on the days when the intermittent supplies of water were on, the quantity discharged *per diem* was 209 gallons *per* house. The waste in this district from defects in house apparatus of distribution, incident to an intermittent supply of water, was, on the water days, three and three quarter times greater than the consumption on those days.

No similar gaugings have, I believe, been made within the City; so I am unable to tell you with accuracy what are the proportions of waste and consumption. In an interview with your Committee on Health, when they were collecting information on the subject, Mr. Mylne, the engineer of the New River Company, stated (as a reason against fulfilling some object desired by the Committee) that within the City of London, in connexion with its distributing apparatus, there existed for the escape and waste of water, during the period of supply, "at least 10,000 open cocks."

Assuming the accuracy of this statement, I doubt whether the average available supply of water for domestic purposes within the City can possibly exceed a quarter of its alleged quantity; and I am persuaded that there must be large numbers of persons to whom the enjoyment even of that reduced average is utterly unknown. Your Hon. Court, observing the incalculable waste, and knowing that the cost of water-supply (as of all other commodities) must of necessity vary according to the quantity supplied, can appreciate the consequences of so much fruitless expenditure.

Evils arising from waste of water.

I would beg likewise to observe to you that this unapplied flood of water is in itself not unobjectionable. It would be of questionable advantage if the drainage of the City

were so perfect as to carry all away without inundation of the soil; while under opposite circumstances, in every quarter where drainage is absent or faulty, evil must arise from the extensive and habitual infiltration of moisture.

On the extreme inconvenience which attends the storage of water in the poorer habitations of the City, I have already reported to you, and will now only add that increased experience has given much confirmation to my view. Their receptacles are generally such as contribute to the contamination of water, and are constantly so arranged as to invite an admixture of the most varied impurities.

In the large proportion of them, which are open casks, one sees habitually a film of soot floating on the surface; one sees (if indeed one can see so deeply into water which is often turbid and opaque) that filth and rubbish lie at the bottom; one sees the interior of the cask itself dirty and mouldering.

Ineffectual water supply to closets.

I now merely glance at this part of the subject, because you have already on other occasions allowed me to state my knowledge at greater length. But there is one evil in particular to which I would beg leave to advert. Those works of drainage which are established under your orders depend for their efficiency on a proper supply of water; and in every case where you enforce the construction of house-drains, you order that those drains shall be served efficiently with water. Your wishes on this subject are nominally complied with by those on whom your orders are served, but are often virtually evaded by a filthy and ineffectual contrivance. The butt or cistern of the house—that on which the inmates depend for their supply of fresh and pure drinking-water, is placed in immediate contiguity to the privy, so as to reduce the requisite length of connecting pipe to the fewest possible number of inches; the application of water is not made discretionary on the users of the privy, nor are any of the cheap and common self-acting contrivances introduced; but the waste-pipe of the butt or cistern is conducted into the discharge-pipe of the privy, so that, *periodically*, with a frequency varying according to

the arrangements of the water-company, the arrears of excrement are removed, so far as the overflow of the water-receptacle may have power to dislodge and propel them. Frequent evidence has been before me of the insufficiency of this arrangement: and, in addition to its actual failure (on the reasons of which your Surveyor can speak more competently than I) there is strong reason to object to its prevalence on other grounds. Water, as you probably know, is a very active absorbent of many gaseous materials; and the open butts, which are thus placed in immediate contact and communication with privies, must rapidly become infected by their foulness. I need not explain to you how injurious an addition this is to the other objectionable incidents of water-storage, or how unattractive as a beverage to the poor inhabitants of the City must be this vapid privy-flavoured stuff.

Objectionable incidents of water storage.

For this arrangement I can suggest to your Hon. Court no easy alternative or remedy, so long as the distribution of water continues to be on its present intermittent plan: but it is matter for extreme regret that, by circumstances over which you have no control, the success of your sanitary measures should be seriously diminished. By the enforcement or execution of house-drainage, your Hon. Court has conferred great advantages on many districts of the City; but it is my duty to tell you that, in my judgment, the present condition of the water-trade contributes to neutralise those advantages, and constitutes a restriction on your power of doing good.

As respects the evils to which I have just adverted, unquestionably they admit of abatement by devoting separate water-receptacles to the very different uses of diet and drainage. But the expense of additional cisterns in tenements so poor cannot be considered trifling; and I believe that your Hon. Court would hesitate, even if you have the power, to enforce this double burthen on the owners of house-property, at a time when one may reasonably hope that the necessity for cisterns will be superseded.

Separate cisterns for closets.

There can be no doubt on the extreme degree in which it is desirable for the poor of the City of London, that water

should be delivered to their houses on the principle of constant supply, and that they should thus be relieved from the expensive and unwholesome necessity of storing it in small quantities and in improper receptacles. That it is *desirable* is a certainty within my official knowledge and on which therefore I can give an opinion of my own. That it is *practicable* is not within my official knowledge; for in this part of the question are involved various considerations of hydraulic engineering, on which I am incompetent to offer an opinion. But I cannot ignore the fact, that in many parts of England and Scotland the practicability of a constant supply has been evinced by the very conclusive evidence of its success. To some such instances I alluded in my last Report, and from the present year I can quote you a striking additional one. At Wolverhampton, in 1849, the system of supply, which had previously been intermittent, was made continuous. Instead of waste ensuing on the change, its immediate effect was a reduction of 22 *per cent.* on the quantity consumed. So great had been the unpopularity of the intermittent system of supply, that at the time of the change the company had not more than 600 customers. Immediately on the adoption of the new system, their customers increased, and within ten months had risen to 1400. This increase was continuing up to the date of the Report (May 4th, 1850), at which time they were adding to the number of their customers at the rate of 50 each week. The above facts (as is well observed by the resident engineer, Mr. Marten) may be taken as a fair test that the system of continuous supply is one of superior adaptation to the domestic wants of the public.

Need of constant water supply.

This case is but an inconsiderable fraction of the evidence which lies before the public on the subject of continuous supply. With such evidence before me, in contrast to what I observe of the distribution of water within the City of London, I cannot refrain from repeating to your Hon. Court my confirmed and deliberate opinion that our method of supply is essentially bad, and that it withholds from the poorer population of the City a large proportion of those sanitary advantages which it is the object of water to confer.

No doubt it will occur to you that against evils of this nature—evils arising in the conflictive interests of water-buyer and water-seller, the first principles of commerce imply a resource; and that in this matter, as in others of the sort, a customer holds in his own hands the remedy for his dissatisfaction. But although the supply of water, in the hands of the powerful companies who vend it, is in many respects a common transaction of trade, and as such is in theory open to competition, yet I would beg to point out to your Hon. Court that, in regard of the City under your jurisdiction, no such check and no such stimulus as competition can virtually be said to exist. In every practical sense the sale of water is a monopoly. The individual customer, dwelling in Cripplegate or in Farringdon, who is dissatisfied with his bargain in water, can go to no other market; and however legitimate may be his claim to be supplied with this prime necessary of life at its cheapest rate, in the most efficient manner, and of the best possible quality, your Hon. Court, hitherto, possesses no power to enforce it.

Sale of water a monopoly.

All who have given impartial consideration to the subject seem to concur as to the advantages which result from a control over the supply and distribution of water being possessed by those who are responsible for the drainage and cleanliness of a district. These different duties are in such essential relation to each other that they would seem almost of necessity to require a single direction and control. House-drainage pre-supposes water-supply; water-supply pre-supposes house-drainage; the efficiency of either implies their mutual adaptation; just as the circulation of blood within an animal body implies uninterrupted continuity of arteries and veins, each harmonising with the uses of the other, to ensure the efficiency of the whole. But while the works of drainage executed under your orders lose much of their sanitary usefulness for want of an effectual water-supply, your Hon. Court has no power of interference in the matter, closely associated as it is with the performance of your other functions. These anomalies would be removed, and a most beneficial power over the distribution of water

Sanitary authority should acquire control of water-supply.

would be vested in the hands of your Commission, if in the renewal of your Act of Parliament you procured authority to represent the citizens in this matter. All the advantages which could possibly be gained by competition, together with many benefits which no competition could ensure, would thus be realised to the population under your charge; if, namely, a clause were inserted in your Bill, empowering you, at your discretion, to contract corporately with any person or any company for the supply of water to the City of London.

In the Public Health Act (passed simultaneously with yours) an enactment of this nature exists, authorising local boards of health to "provide their district with such a supply of water as may be proper and sufficient," and for this purpose "to contract with any person whomsoever to do and execute all such works, matters, and things as shall be necessary and proper, and to require that houses shall be supplied with water," and to "make and levy water rates upon the premises, at a rate not exceeding twopence *per* week." With a power like this in your hands, you would easily enforce for the City of London whatever method of supply you might deliberately believe to be best; and you would then be enabled and entitled, in the application of other clauses in your Act, to require of landlords acting under your orders, a far completer, though less expensive, improvement of their property than you are yet in a position to obtain.

In submitting to your Hon. Court my views as to the expediency of your having a controlling power over the supply of water, I am glad to find myself supported by the recorded opinion of the present Lord Mayor, himself formerly the Chairman of a Commission of Sewers; and I am induced to believe that such an addition to your functions might not be objectionable to the water companies, as I observe that Sir William Clay, the chairman of two metropolitan companies, has expressed himself strongly on its "great and obvious convenience."

Quality of City water-supply.

Of equal importance with anything which relates to the distribution of water are those momentous questions

which relate to its *quality*, and which tend to determine its fitness for human consumption.

Considering the great share of public attention which these questions at present very properly obtain, the many projects which are broached for improving the quality of our metropolitan supply, and the importance of your being in a position to decide as to the merits of any plan which may affect the City of London, I have thought it desirable in this Report to submit to you some general observations on the subject. During the last few months, I have accordingly been collecting such information as might, in my judgment, be useful for this purpose. In pursuing one portion of my inquiry—that which relates to the chemical constitution of certain waters—I have availed myself of the permission of your Hon. Court to procure a limited amount of assistance from some one more conversant than myself with the practice of analysis. For this purpose I have addressed myself to Mr. Thomas Taylor, lately Lecturer on Chemistry at St. Thomas's Hospital, a gentleman on whose skill and impartiality I can implicitly trust. His account of the very careful analyses which he has made is subjoined to my Report. Concurrently with the experience of other chemists, it has furnished me with material for many of the conclusions which I am about to lay before you.

The water which is supplied by the New River and East London companies for the consumption of the City of London is substantially of one kind. The River Lea, on which the East London Company entirely depends, furnishes likewise much of the supply conveyed by the New River.* The springs in which the latter originate are of the same chemical kind as those which contribute to the Lea; and the artificial aqueduct runs its forty miles of course through much the

* It appears that the New River Company at present derives about two-thirds of its supply from the River Lea, and proposes to draw from this source a still larger proportion. Any chemical difference of quality in the City pipe-water (as between that supplied by the New River and that by the East London Company) would probably not exceed those limits of difference which prevail in respect of waters gathered *under varying circumstances* from one and the same source.—J. S.

same country as the natural river. Chemically, therefore, one description may apply to both; and I the rather speak of them conjointly, as any extension of its resources for our supply which the New River might obtain, would apparently be provided by increasing considerably its present draught from the Lea.

The pipe-water consumed in the City has for its general chemical character, that it contains a considerable quantity of carbonate of lime, held in solution by an excess of carbonic acid. To this and another salt of lime (the sulphate) the water chiefly owes the property which is complained of under the name of *hardness:* it is by reason of these salts, namely, that it decomposes a certain large proportion of whatever soap is used with it; preventing the formation of a lather, till those salts are exhausted by a wasted proportion of soap, by boiling or otherwise, and hindering to that extent the several purposes for which soap is employed. You are probably aware that soda is extensively used in the laundry, as an antidote to this objectionable quality of hard waters; and the excess of its employment tends, by corrosion, very observably to hasten the destruction of washed articles of dress. In the same measure as water possesses the property of decomposing soap, its utility as an universal solvent is impaired; it extends to various other substances which one seeks to dissolve in it (especially to many vegetable matters) that same disposition to waste them in the form of insoluble precipitates. Its conveniences for the purposes of cooking and manufacture are *pari passu* diminished.

Of the actual extent of which these disadvantages are sustained within the City of London, I have no means of forming an exact opinion; but statements are before the public (from the general correctness of which I have no reason to withhold reliance and belief) rating the pecuniary loss to the metropolis, in the two articles of soap and tea, at a very high figure. You will see from Mr. Taylor's observations the proportion in which waste occurs, as regards one of these articles; namely that, for the production of a lather in washing, the pipe-water of the City of London, used

without boiling, consumes from 13 to 19 times as much soap as distilled water would consume.*

The chemical constitution of these waters occasions another inconvenience. Their carbonate of lime is held in solution (in the chemical form of bicarbonate) by an excess of carbonic acid: under the influence of heat this excess is gradually disengaged and driven off; consequently, as they approach the boiling point, they begin to precipitate the earthy salt which that gas was instrumental in dissolving. Each gallon of water under these circumstances would deposit from 10 to 15 grains of earthy matter on the interior of whatever vessel might contain it, or on the surface of whatever solid—linen or mutton—might be contained in the boiler. Hence arises the well-known *furring* of vessels in which such waters have habitually been boiled.

I refrain from dwelling on the economical considerations which arise in these points of the subject, as very obvious inferences from the result of chemical analysis; and I pass to other matters more strictly within my own province of observation.

Is water thus constituted in any degree detrimental to the health of those who drink it? It is not in a single word that this question can be fairly answered. Almost insuperable difficulty belongs to it, from the absence of any statistical method by which we might isolate the water-drinking portion of our population, and might compare them, in regard to the diseases to which they are liable,

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* It has been alleged that, by the use of soft water, the saving in soap would probably be equivalent to the whole of the money at present expended on water-supply; and that in the article of tea, the economy would amount to about one-third of the tea now consumed in the metropolis. It strikes me as possible that, in forming these estimates, the argument may have proceeded too much from a consideration of the hardness of London waters in their unboiled state; and that sufficient allowance may not have been made for the change which boiling produces. If boiling were prolonged for some hours before culinary or detergent use of the water, the results (for tea or soap) would be identical with those produced under the employment of soft water. Notoriously this precaution is not taken: but to avoid disputable ground, I confine myself to *the fact of considerable pecuniary loss*, arising from the cause in question, and I avoid any attempt to determine its exact amount.—J. S.

with similar sections of population in soft-water districts and in harder-water districts. Obviously, no other method of comparison can be unobjectionable; and, in arguing the subject from such materials as I have, I can pretend to nothing more than a rational approximation to truth.

Injurious effects of hard water.

Except in the comparatively few instances where active medicinal agents are naturally dissolved in a water, its effects, if injurious, would be so slow as to elude ordinary observation. If, as is exceedingly probable, the same constitution of water as impairs its solvency out of the body, do likewise operate against its being the most eligible menstruum or dissolvent for processes occurring within the body—such processes I mean as attend the act of digestion; if the lime and other hardening ingredients which waste soap in our laundries, and tea in our parlours, do similarly waste within us those organic agencies by which our food is dissolved and converted; any result arising from this source would be of gradual operation, would not easily admit of being traced to its source, and (except in susceptible persons) would rarely produce such symptoms as might immediately draw attention to their cause. The ill effects (whatever they may be) arising from the use of hard waters must be looked for in chronic impairment of digestion, and in those various derangements of nutrition in distant parts (the skin and teeth particularly) which follow as secondary results on such chronic disorder. It would be ridiculous to look for the operation of an ill-chosen water, after its habitual use during two centuries, as though one were inquiring for the symptoms of an acute poison. The signs that are to be ascertained among a population, if such signs exist, are those which would evidence a premature exhaustion of the power of digestion, and would testify that the machine on which we depend for that power had been exposed to unnecessary and avoidable fatigue. This, I believe, is the utmost which Medicine, proceeding from theoretical grounds, would venture to say on the subject.

Perhaps I need not inform you that indigestion, with all that follows from it, is so frequent in the metropolis, in persons after the first strength of youth, that, for large

classes of society, a perfect discharge of the natural process of digestion (such a discharge of it as a lecturer would describe to be the exact type and intention of Nature), is exceptional and rare. Unquestionably, in large numbers of cases, wine and beer and spirits, rather than water, have to do with this effect. Unquestionably, other influences of metropolitan life—and, not least, the mental wear and tear which belong to its large excitement, contribute immensely to this chronic derangement of health; but there are reasons likewise for believing, that the quality of water consumed is not a matter of indifference to the result. We cannot but give it an important place among those influences of health or unhealth which we consider *local;* and we cannot refuse to recognise the fact, that in recommending our patients (as we do often recommend them) to try "change of air" for complaints which baffle us by their obstinacy, so long as the subject of them remains in London, the course on which we rely for success implies "change of water," equally with that other change to which more popular importance is attached.

In illustration of this view, I may quote to you the experience of two other towns. Dr. Sutherland stated, in evidence before the General Board of Health, that having lived for a number of years at Liverpool (where the water is said to be of about the same degree of hardness as ours), he had long entertained a conviction that "the hard water, in a certain class of constitutions, tends to produce visceral obstructions; that it diminishes the natural secretions, produces a constipated or irregular state of the bowels, and consequently deranges the health. He had repeatedly known these complaints to vanish on leaving the town, and to re-appear immediately on returning to it, and it was such repeated occurrences which fixed his attention on the hard selenitic water of the new red sandstone as the probable cause, as he believed it to be, of these affections." (Rep. p. 51). And Dr. Leach, of Glasgow, stated before the same Board, as the result in that town of two years' experience of a substitution of soft for hard drinking water, that, in his opinion, "dyspeptic complaints had

become diminished in number;" and that it had "been observed, since this change, urinary diseases have become less frequent, especially those attended by the deposition of gravel."

Inferences useful for ourselves cannot be drawn from statements like the above, on the fullest assumption of their accuracy, without comparing the waters referred to with our own, more completely than is done by the one characteristic of "hardness;" and there may likewise be other qualifications requisite for an application of the analogy. But those disorders of health which are specified by the gentlemen quoted, as produced by the use and diminished by the disuse of hard waters, are such as might very probably stand in the relation of effect to their alleged cause; results, namely, primary and secondary, of disordered digestion.

Practically, I may tell you, that there are many individuals whose stomachs are extremely sensitive to the impression of hard water, who derive immediate inconvenience from its use, and who refuse to drink it without artificial reduction of its objectionable quality. I may likewise inform you that a physician, recently deceased, whose knowledge of indigestion and its chronic effects (especially in relation to the skin and urinary organs) was most profound and accurate, and whose consulting practice in such disorders was for many years almost a monopoly (I mean Dr. Prout) was in the habit of enjoining on his patients the use of distilled water. He evidently considered that the consumption of such waters as are habitually drunk in the metropolis was detrimental, at least to an enfeebled digestion. This is an opinion which, I have reason to believe, is generally entertained by medical practitioners in London.

It may not be irrelevant to mention to you (since the influence of imagination or of artificial habits can have little to do with this result) that horses are liable to be much inconvenienced by hard water, if unaccustomed to its use; and it is, I believe, notorious that grooms in charge of racers habitually take the trouble of conveying with them, to their

temporary racing stables, a supply of the accustomed water. Veterinary surgeons say that under the continued use of hard water, which horses will avoid if possible, their coats become rough and staring;—an effect, I may observe, analogous to those skin-disorders of the human subject which are apt to occur from impairment of the digestive functions.

Taking into account all these considerations, together with others of a more technical description; and believing that water is eligible for human consumption in proportion as it is free from the admixture of any material foreign to its simple elementary constitution—exception being made only of so much dissolved air as will render it sparkling and palatable; I entertain no doubt that a water, devoid of considerable hardness, would (*cæteris paribus*) for the purposes of cooking and drinking, be far preferable to that which the companies now distribute through the City of London.

Hitherto, however, I have spoken of the waters supplied to the City, merely as regards that large impregnation of earthy material which they gather from their source; and I have criticised them only in respect of that admixture. Their essential chemical quality is one native to the soil from which they are derived; and whatever censure thus far belongs to them could only have been avoided by the selection of a different source. Chemistry, in the days of Morrys and Myddleton, was not sufficiently advanced to inform the water-merchants of a city on those different conditions which determine the fitness of a soil to serve as the natural or artificial *gathering-ground* of a supply; and by which (as they vary in different localities) hardness is imparted to the rain-fall of one district, while softness is preserved for that of another.

Organic pollution of water supplies.

But there are other evils belonging to these waters, less appreciable indeed by chemistry, but open to universal observation, and meriting unqualified blame. They are conducted to the metropolis in open channels; they receive in large measure the surface-washing, the drainage, and even the sewage of the country through which they pass; they derive casual impurities from bathers and barges; they are liable to whatever pollutions mischievous or filthy persons

may choose to inflict on them; and then on their arrival in the metropolis (after a short subsidence in reservoirs, which themselves are not unobjectionable) are distributed, without filtration, to the public. Whatever chemistry may say on this subject (and I need not remind you of very powerful causes of disease which lie beyond its cognisance), I cannot consider it matter of indifference, that we drink—with whatever dilution, or with whatever imperfect oxidation, the excremental and other impurities which mingle in these sources of our supply. Such admixtures, though in their *quantity* less, are in their *quality* identical with those which render Thames-water, as taken at London Bridge, inadmissible for domestic consumption, and which occasion it, when stored for sea-use, to undergo, before it becomes fit to drink, a succession of offensive changes strictly comparable to putrefaction.

In this slovenly method of conveyance and distribution there is a neglect of common precaution for the purity and healthfulness of the supply, which I must report to you as highly objectionable: and this—the method of supply to our great metropolis, strikes one the more with astonishment and disgust, as one reflects on the long experience and admirable models which past centuries in foreign countries have supplied; and especially, as one remembers those colossal works which, more than two thousand years ago, were constructed under the Roman government, for the cool and cleanly conduction of water.

The present imperfections of knowledge forbid me to cite, as definite causes of disease, the contaminations to which I have adverted; I cannot say to you—pointing to our classified list of sickness and mortality, *this* depends on drinking the diluted drainage of Hertford, *that* on the contributions of Ware. Indeed I know that, under the influence of the river and the atmosphere, very considerable changes occur in the materials thus furnished, tending eventually to render them inert; and if injury to life occur from their ingestion, it is probably only under peculiar and exceptional conditions, increasing their quantity, or delaying their oxidation. In protesting against their continued distribution as articles

of diet, I therefore insist less on inferences deducible from medicine, and shall probably have the concurrence of your Hon. Court in grounding my appeal on the common principles of taste.

On the incidental contaminations to which the pipe-water consumed within the City becomes liable, by reason of its storage in receptacles both foul in themselves and surrounded by causes of foulness, I have already addressed you; and I have shown to you the dependence of this evil on the system of intermittent supply as adapted to the houses of the poor.

Of other sources of water-supply existing within the City of London, there are many of small extent in the form of superficial springs. These are eagerly sought after, sometimes from a distance, on account of their coolness and sparkling condition. In the Appendix you will find an account of one of these waters—that in the vicinity of Bishopsgate church, which is very much drunk in that quarter of the City. Any praise given to it illustrates exceedingly the fallacy of popular judgment on such subjects, and shows how easily those qualities of coolness and freshness, which are absent from stored waters, impose on the palate, and induce a preference to be given to waters which are relatively most objectionable.

Wells in vicinity of graveyards.

The chemical faults which belong to our London pipe-water are possessed in a far greater degree by this water of Bishopsgate pump, and the latter has moreover some vices which are absent from the former; but the vapidity and fustiness of water which has been stored in cisterns are so repugnant to the taste, that the water chemically preferable is not in practice preferred.

To the use of waters of this description, within a large city, there is always much objection. In addition to extreme hardness, which in London they universally possess, they are liable, in a dangerous degree, to become contaminated by the leakage of drains, and by other sources of impurity; as, for instance, where situated within the immediate vicinity of grave-yards they derive products of animal

decomposition from the soil.* Very recently, a celebrated pump within the City of London, that adjoining St. Bride's church-yard, has been abandoned on account of such impregnations. Or perhaps I should rather say (for the difference again illustrates the readiness with which the palate is deceived or corrupted) that it was not *abandoned*— for till almost the last moment the neighbours adhered to it with fondness; but the parochial authorities — alarmed by the proximity of cholera — caused its handle to be locked.

As an available source of supply to the City of London, the use of deep (Artesian) wells has been recommended: the clearness and softness of these waters, together with their freedom from organic matters, having concurred to suggest their employment. I feel bound to express the strongest opinion against the fitness of these waters for the purpose of beverage. They uniformly contain a considerable proportion of medicinal ingredients; they are capable of exerting definite and demonstrable influence over the natural actions of the body; and information is before me of various injury to health, affecting large numbers of persons, arising from the continued dietetic use of such waters.

Water supply for the City. Scheme of General Board of Health.

In addressing your Hon. Court on the subject of water-supply for the City, it is impossible that I should do otherwise than advert to the fact, that, during the last few months, under the auspices of Her Majesty's government, as represented for sanitary purposes by the General Board of Health, a plan has been gradually maturing itself for the supply of the entire metropolis with pure soft water. Founding itself

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* This is illustrated in the analysis of Bishopsgate pump-water, just alluded to. The very large quantity of *nitrates*, there referred to that water, must be due to the oxidation of human bodies in the adjoining soil, which serves in part as gathering-ground to the spring. I should fear that, during rain-fall, this oxidation of organic compounds may not always have completed itself, and that materials of decomposition *still in progress of decay* may thus often be mingled in the water. I have lately had occasion to recommend that the use of Aldgate pump should be discontinued on account of its water containing, in addition to a large quantity of alkaline nitrate, so much unoxidised organic matters, as were sufficient to give it a foul taste.—J. S., 1854.

on very extensive investigations as to the qualities of water, as to the influence of soils on its chemical composition, as to the relation between streams and rain-fall, as to the hydraulic principles of distribution, and the like, this plan proposes to gather water in certain silicious soils, which can impart to it the least possible admixture of foreign ingredients; to conduct it in closed channels, with every precaution for its perfect purity; and to distribute it throughout the metropolis, at a rate which shall be from 30 to 50 *per cent.* less than our present water-charges. The proposed area for the collection of this supply is in the extensive range of sandy soil in the south of Surrey, extending around Farnham, about ten miles in each direction. Since the publication of the first Report made on this subject by the General Board of Health, unremitting inquiry has been advancing, under their direction, into all details of the plan; and the Hon. William Napier, who, with others, has been engaged in the investigation of the proposed sources, has advocated an important modification, which promises to reduce very considerably the anticipated expense of the undertaking. The essential and most important principles which governed the Board, in arranging their plan, were, first, to seek their supply in a silicious soil, where little soluble material could exist for its contamination; secondly, to take possession of the water so near to its source that all its original purity might be preserved; and, during conduction, to isolate it from those contaminations which are incidental to the onward passage of a stream through miles of promiscuous country. To fulfil these indications, there were two conceivable courses; and studious local inquiries could alone determine which of them was preferable: on the one hand, if the streams which represent the natural drainage of the country should be found uniformly pure and copious, they might admit of being conducted bodily into the artificial river of supply: on the other hand, it might be requisite to carry the interference of art still further, to absorb the filtering moisture of this large sand-district before it had become confluent into streams, and thus from day to day, by extensively ramified works of

artificial sub-drainage, to derive immediately from the soil, the varying contributions of rain-fall and dew. The Board, apparently solicitous for the completer security of their plan, preferred to estimate its cost on the latter very expensive supposition; they allowed apparently for the diffusion of drain-pipes over 150 square miles of country, and for a reservoir which should contain storage of water equivalent to a very long metropolitan consumption. The later examination, made by Mr. Napier and confirmed by others, tends and appears to show, that these large sources of expense may be avoided; that the waters may be collected of unusual purity and softness, where they have united themselves into rivulets of considerable volume; that the gauged and estimated dischage of these rivulets is sufficient day by day for the needs of the metropolis, according to the largest construction of those needs; that capillary drain-pipes and very extensive storage-room may thus be dispensed with; and that under the modification of arrangement suggested by these facts, some very large reduction might be inferred for the total estimate of this comprehensive plan.

Many of these particulars are already before the public; but in a matter of so much importance to the health of the City, as that of participating in a supply of pure water, collected and distributed on the soundest principles, and sold at the cheapest rate, I did not think it would become me, as your Officer of Health, to remain an indolent auditor. I have felt it my duty to inform myself, so far as I could, on the real merits of this scheme, and on its probable relation hereafter to the sanitary condition of the metropolis. I have spent three days on the site of the proposed sources, and many other days in informing myself on all the bearings of the subject. I have likewise collected water from a proposed tributary of the future supply, which has been analysed, and which shows (as my Appendix will illustrate to you) a remarkable and rare excellence. On one occasion of visiting the country, I was accompained by Mr. T. Taylor, and we made on the spot a sufficient number of extemporaneous examinations, to assure us that the essential features, shown in the more elaborate analysis, are (as geolo-

gical considerations would lead us to believe) the general characters of water throughout the district.

On any other than the sanitary relations of this subject I can have nothing officially to say; but, confining myself to these relations, I may certify to your Hon. Court that the water in question is, in my judgment, of a quality admirably suited for domestic purposes; that its distribution through the City of London would conduce to the health and comfort of the population; and that the principles, proposed by the Board for its collection and conveyance, appear to me such as sanitary science, in its present condition, should counsel for the water-service of the metropolis. Quality of water supply.

There is, however, one aspect of the subject which must not pass unconsidered. Water that is free from earthy ingredients requires a peculiar distributory apparatus. If conveyed in leaden pipes with access of air, or if stored in leaden cisterns, it corrodes the metal of which they are composed, and is liable to derive from this source an impregnation very hazardous to life. Under certain circumstances, especially under alterations of air and water (such as occur in the intermittent supply), or where organic impurities are held in solution or suspension, or probably where from any cause uncombined carbonic acid is present, even the hardest waters are not free from this risk. Speaking generally, however, it affects soft water chiefly; distilled water most of all: and the Farnham water (in common with all pure water) is decidedly liable to this empoisonment, if used with leaden apparatus of conduction and storage. In my Appendix you will find some interesting particulars on this head; and you will observe that with experiments conducted by Mr. Taylor in imitation of the constant supply (*i.e.*, with total submersion of the metal) the formation of carbonate of lead in the Farnham water was exceedingly gradual. This concurs with the alleged experience of Aberdeen, where it is said by Professor Clark to have been found (to my mind, by a somewhat dangerous trial) that pure and soft water, *distributed on the principle of constant supply*, does not exert on the leaden pipes any action injurious to the health of the population. You will likewise Dangers of leaden cisterns where water supply is soft and intermittent.

observe, that when hard water, as at present employed in the City, is softened by boiling, it acquires this property of pure water, and becomes capable of acting on lead; and here is an important observation, as it has been proposed by similar artificial means, employed on a very large scale, to soften all the water now distributed in the metropolis.

Obviously, as regards one and all of the many proposals for supplying water destitute of hardening ingredients, any chemical process, or any change of source, which might lead to the distribution of such pure water through the metropolis, could not be considered as a single and separate reform, but must be undertaken conjointly with such alterations in the distributive arrangements as might be requisite for removing from the new plan *any chance, however slight, or remote, of injuring the population by metallic poison.*

What those alterations must be, it would now be premature to decide. The experience of Aberdeen might seem to suggest, that the system of constant supply (on all other accounts so eminently desirable for the metropolis) would in itself, if accompanied by the total disuse and prohibition of leaden cisternage, give sufficient security against the danger in question; or, on the other hand, further inquiry may show it to be quite indispensable for a safe distribution of the new supply, that leaden pipage should be entirely superseded by the use of some non-metallic material, as earthenware or glass. Should this change become necessary, its adoption would no doubt be facilitated by the comparative cheapness of these preferable materials.

SOCIAL CONDITION OF THE POOR.

[Where the reports refer to the Social Condition of the Poor, and the character of their house accommodation, they bear upon subjects which are of fundamental importance to all politicians and sanitarians. Seventeen years later, in commenting upon Dr. Hunter's "*Report on the Housing of the Poor in Towns*," Mr. Simon dwells upon the enormous influence which these conditions thus early described by him exercised upon the public health. They constituted—he said—evils "sufficient in their gigantic magnitude to neutralize what-"ever in other respects was being attempted for the improvement of "health."—ED.]

From First Annual Report.

Habits of the poorest classes.

Last, and not least, among the influences prejudicial to health in the City of London, as elsewhere, must be reckoned the social condition of the lower classes; and I refer to this the more especially, because often, in discussion of sanitary subjects before your Hon. Court, the filthy, or slovenly, or improvident, or destructive, or intemperate, or dishonest habits of these classes, are cited as an explanation of the inefficiency of measures designed for their advantage. It is constantly urged, that to bring improved domestic arrangements within the reach of such persons is a waste and a folly; that if you give them a coal-scuttle, a washing-basin, and a water-closet, these several utensils will be applied indifferently to the purposes of each other, or one to the purposes of all; and that meanwhile the objects of your charitable solicitude will remain in the same unredeemed lowness and misery as before. Now it is unquestionable, and I admit it,—that in houses containing all the sanitary evils which I have enumerated—undrained, and waterless, and unventilated—there do dwell whole hordes of persons, who struggle so little in self-defence against that which surrounds them, that they may be considered almost indifferent to its existence, or almost acclimated to endure its continuance.

Habits of the very poor.

It is too true that, among these classes, there are swarms of men and women, who have yet to learn that human beings should dwell differently from cattle; swarms, to whom personal cleanliness is utterly unknown; swarms, by whom delicacy and decency in their social relations are quite

unconceived. Men and women, boys and girls, in scores of each, using jointly one single common privy; grown persons of both sexes sleeping in common with their married parents; a woman suffering travail in the midst of the males and females of three several families of fellow-lodgers in a single room; an adult son sharing his mother's bed during her confinement;—such are instances recently within my knowledge (and I might easily adduce others) of the degree and of the manner in which a people may relapse into the habits of savage life, when their domestic condition is neglected, and when they are suffered to habituate themselves to the uttermost depths of physical obscenity and degradation.

Overcrowding amongst the poor.

Here again, as in an earlier part of my Report, I think it requisite to remark, that I do not mean in any degree to suggest that the evils adverted to present themselves within the City to a greater extent than in sundry other parts of the metropolis. My sphere of duty lies within the City boundary, and it would be an impertinence in me to comment, either favourably or unfavourably, on districts which lie within another jurisdiction than that of the Commission which I have the honour to address. Simply to guard myself against the possibility of being misunderstood, I again draw attention to the fact that I studiously refrain from instituting comparisons with other metropolitan localities. Let me likewise observe that I am far from insinuating, or suspecting, that the majority of the poorer population of the City has fallen to that extreme debasement which I have just illustrated as affecting some portion (perhaps not an inconsiderable portion) of the poorest; but I dare not suppress my knowledge that such instances exist, nor can I refrain from stating my belief, that ignorance and poverty will soon contribute to increase them, if sanitary and social improvement do not co-operate against their continuance.

Contemplating such cases, I feel the deepest conviction that no sanitary system can be adequate to the requirements of the time, or can cure those radical evils which infest the under-framework of society, unless the importance be

distinctly recognised, and the duty manfully undertaken, of improving the social condition of the poor.

Those who suffer under the calamitous sanitary conditions which I have disclosed, have been led, perhaps, to consider them as inseparable from poverty; and after their long habituation to such influences, who can wonder if personal and moral degradation conform them more and more to the physical debasement of their abode? In the midst of inevitable domestic filth, who can wonder that personal cleanliness should be neglected? In an atmosphere which forbids the breath to be drawn freely, which maintains habitual ill health, which depresses all the natural spring and buoyancy of life, who can wonder that frequent recourse should be had to stimulants, which, however pernicious in themselves, still for a moment dispel the malarious languor of the place, give temporary vigour to the brain, and cheer the flagging pulses of a poisoned circulation? Who can wonder that habits of improvidence and recklessness should arise in a population, which not only has much ignorance and prejudice amongst it, but is likewise often unaccustomed to consideration and kindness? Who can wonder that the laws of society should at times be forgotten by those whom the eye of society habitually overlooks, and whom the heart of society often appears to discard?

I believe that now there is a very growing feeling abroad, that the poor of a Christian country can no longer, in their own ignorance and helplessness, be suffered to encounter all the chances which accompany destitution, and which link it often indissolubly to recklessness, profligacy, and perdition. The task of interfering in behalf of these classes, however insensible they may be of their own danger and frequent degradation, begins at length to be recognised as an obligation of society; and as such an interference may be fraught with the utmost advantage to sanitary progress, I shall now proceed to point out the manner in which, with this view only, it may most usefully and most humanely be made.

First of all I would point out to you, that within your Act of Parliament there are contained some enactments on

this subject which might be of great value, were it not for their very limited application:—"Whereas the owners and keepers of lodging-houses of an inferior description, for the accommodation of mendicants, strangers, and other persons for the night, or other short periods, allow the same to be crowded, by receiving more lodgers than such lodging-houses are adapted to contain with a due regard to health," therefore, and for some other reasons enumerated in the 91st clause, it is enacted that you may require the registration, and may order the periodical inspection of such houses; that you may from time to time fix and determine the number of lodgers who may be accommodated in each lodging-house; that you may issue "rules or instructions regarding health, cleanliness, and ventilation;" that you may "order that a ticket, containing the number of lodgers for which the house is registered," together with your rules and regulations, "shall be hung up, or placed in a conspicuous part of each room into which lodgers are received;" and finally, "that if any keeper of such lodging-house shall offend against any of these provisions, he shall be liable for each such offence to a penalty not exceeding 5*l*., and the like penalty for every day after the first upon which any such offence shall be continued." The spirit of these enactments is excellent; but unhappily the definition given at the end of the clause excludes from the operation of the law those very cases which most need to fall within it. "Common lodging-house" (it runs) "shall, for the purposes of this Act, mean any public lodging-house, not being a licensed victualling-house, in which persons are harboured or lodged for hire, for a single night, or for less than a week at one time, or in which any room is let for hire to be occupied by more than one family at one time." Lodging-houses, according to this definition, are (I am informed) hardly to be found within the City of London; and the clause has remained, and seems in its present form likely to remain, quite inoperative. If, in any future renewal or amendment of your Act, the definition could be modified in such a manner, that the powers given in respect of lodging-houses should be extended to all the poorer tene-

Lodging house regulations.

ments of the City, where the several floors are let separately at a weekly rent, the clause in question would be rendered one of the most serviceable in the Act, and one of the most general application. In its present form, the clause barely enables you to deal with the temporary bed-accommodation of trampers and vagrants,—a class happily not very numerous in the City; while, modified in the manner I suggest, it would put under your sanitary regulation the whole household economy of the permanent industrial population of the City; and, if effectively worked, would conduce beyond all estimation to the physical, social, and moral improvement of that class.

Influence of education in sanitary progress.

Secondly, and as a matter of even higher importance, I would beg you to consider the incalculable good which may be conferred on the poorer classes of society, by the direct educational influence of those in better and more enlightened circumstances than their own. When I say that all the social errors, to which I now more particularly refer, would gradually but swiftly vanish under the influence of education, I do not mean that the cure would lie in learning to read and to write and to sum:—though these attainments, of course, would largely increase the power, usefulness, and market value of their possessor. The education to which I refer, as an all-important influence for sanitary progress, is that which would consist in exhibiting to the lowest classes of society frequent practical evidences of the attainability and the advantages of higher civilization; an education which, by model and examples, would lead them to know cleanliness from dirt, decency from grossness, human propriety from brutish self-abandonment; an education which, by sensible experience, would teach them to feel the comfort and the profit of sanitary observances, and would apply their instinct of self-preservation to the deliberate avoidance of disease.

It is in this point of view, gentlemen, that I would solicit your attention to the useful and philanthropic exertions of three societies which have been established during the last few years, with the object of improving the condition of the labouring classes; and I would venture

to suggest that the course which those societies have adopted in various parts of the metropolis, is one that might, with the utmost advantage, be pursued within the City of London.

Model lodging houses.

The establishment of *Model Dwelling* and *Lodging-houses*, and of *Public Baths* and *Laundries*, for the use of the labouring population, is now no longer a matter of recent speculation. Under the beneficent auspices of the societies to which I have referred, the following experiments have been tried :—

The Committee for promoting the establishment of Baths and Wash-houses, having at first Mr. W. Cotton, and then Sir H. Dukinfield, for its chairman, and including in its number, with other influential persons, several members of this Corporation, founded, at great pains and expense, a model institution at Goulston Square, Whitechapel. In spite of many circumstances conspiring to render this first and experimental establishment particularly expensive, it has more than supported itself by the small payments of the poor ; and its arrangements are sufficiently extensive for it to have given in one day as many as 932 baths. This fact having occurred in the first year of its establishment, shows how much the poor must have appreciated the additional comfort placed within their reach ; and I may add that, from the first opening of the building, the annual receipts have been progressively on the increase. Somewhat earlier, and under the influence of the same parent-committee, though specially directed by a branch-committee, a similar establishment was founded in George Street, Euston Square.

Public baths and laundries.

During the year 1848 the number of payments made here for bathing was 111,788 ; the number of payments for washing in the laundries, 246,760. This establishment has not only proved self-supporting, but has been enabled to accumulate a large surplus, which is now being applied to enlarge and improve the building. At Glasshouse Yard, near the entrance to the London Docks, there has been founded, on the same model, a small establishment of free baths and wash-houses for the destitute poor. It was opened in May 1845. In the first year the baths given amounted to 27,662 ;

the usings of the laundry to 35,840; and its total working expenses were covered by 378*l.*

Public baths.

No language, however eloquent—no comment, however instructive, could equal the significance of the figures which I have cited as illustrating the great utility of these institutions; and, as regards their pecuniary success, it is impossible to furnish you with better testimony than is comprised in the fact, that the Guardians of the Poor in a great metropolitan parish* have recently, out of the poor-rates, founded an institution of this nature. They have become witnesses to the financial economy of that sanitary and social boon. In their establishment, which is not only self-supporting, but amply remunerative, the poor are enabled to have baths at an expense of a penny for a cold bath, and twopence for a warm bath; and the women are enabled to do their washing, ironing, and drying, with an unlimited water-supply, and with other arrangements of most admirable completeness, at an expense of only twopence for the first two hours, during which they occupy the separate chambers allotted to them. A very considerable proportion of the expense is covered by the receipts for baths given at the higher price of sixpence and with some additional luxuries, to persons of a higher grade in society than those who use the ordinary baths; the former, though used by a different class of persons, being sought with almost as much avidity as the latter.

Public laundries.

In the sanitary point of view, I probably need not insist much on the advantages which these establishments have conferred. You will hardly doubt how good and wholesome a thing it has been for so many thousands to have had the means of cleanliness; who, in the absence of such facilities, must often have carried about their persons accumulations that one sickens to think of; and whose narrow, crowded chambers must constantly have steamed with wash-tubs, and been hung round with reeking clothes.

Next, very briefly, let me allude to what has been done in respect of the habitations of the poor; first, by the Society for the Improvement of the Condition of the

* St. Martin's in the Fields.—J. S.

Labouring Classes, under the patronage of their Majesties the Queen and the Queen Dowager, with the Prince Albert for its President, and Lord Ashley for its Chairman; secondly, by the Metropolitan Association for Improving the Dwellings of the Industrious Classes, under the Chairmanship of Sir Ralph Howard, and with a committee which, like that of the former society, includes many of the best and wisest, as well as the highest persons of the country. Under the influence of these societies the following experiments have been made:—

Model lodging houses.

In the Old Pancras Road a very large building has been erected, to accommodate 110 families separately and distinctly, in sets of two and three rooms each. Each set of rooms has its own boiler, range, oven, and coal-box; its separate scullery, in which are sink, cistern, and dust-shaft; its own water-closet, its own ample supply of water, and many other conveniences. The rents vary from 3*s.* 6*d.* to 5*s.* per week for a set of two rooms; and from 4*s.* 9*d.* to 6*s.* 3*d.* for a set of three rooms. The founders of this establishment have recently purchased land at the end of Spicer Street, Spitalfields, on which to erect a lodging-house for 300 single men, and also houses for families.

In the Lower Road, Pentonville, houses of three different classes have been built, on the same general principle of furnishing every convenience and sanitary requisite. They accommodate, on the whole, 23 families and 30 single women—widows, or of advanced age. The entire houses for families, with all the above-mentioned conveniences, are at a rent of 6*s.*, having a good-sized living-room, two bedrooms, with additional enclosed recesses for children's beds, a yard at the back of the house, and the joint use of a wash-house and drying yard. A floor of two rooms is rented at 3*s.* 6*d.*, and a single room by a single person at 1*s.* 6*d.*

In George Street, St. Giles's, a model lodging-house has been established, affording accommodation to 104 single men, and combining everything essential to such an establishment. The ventilation and drainage have been carefully attended to; an ample supply of water is provided, gas

extends through the house, the dormitories are arranged so as to keep their inmates private from each other; there are washing closets fitted up with every requisite for cleanliness; there is a bath-room supplied with hot and cold water; there are a kitchen and wash-house furnished with all appropriate utensils, a pantry-hatch, with separate, ventilated, and secure compartments for the food of each inmate; in the pay-office is a small well-selected library, for the service of the lodgers, and the use of a spacious coffee-room is likewise for their common convenience. Their pay is 4*d.* per night, or 2*s.* a week—an amount a little above the ordinary rent paid for the most miserable accommodation in a trampers' lodging-house.

At 76, Hatton Garden, a lodging-house for 57 single women has recently been opened, consisting of three floors of dormitories, divided into separate compartments, and a basement fitted up with kitchen, wash-house, bath, pantry, safes, &c.

In Charles Street, Drury Lane, three tenements, originally separate, have been converted into a single lodging-house for 82 single men, on the same general plan and at the same rent as that in George Street, St. Giles's.

All the lodging-houses are furnished; and the inmates are supplied with utensils for their food and other purposes, which must be returned, or made good, at their leaving.

In all these lodging-houses rules exist for the purpose of insuring cleanliness, sobriety, carefulness, and general propriety of conduct; any infraction of which subjects the offender to immediate expulsion. For the sake of those who choose to avail themselves of the opportunity, Scripture readings are appointed to take place in the common room every evening at 9 o'clock; and copies of the Scriptures, with other well-chosen books, are left in charge of the superintendent for distribution among the lodgers, in the hope that they may thus be induced to occupy their leisure to advantage.

In the construction of all these establishments, equally, the greatest pains have been taken to bring sanitary science to bear on the comfort, and convenience, and health of the

inmates. Ventilation, drainage, facilities for decency and for cleanliness, have in every instance been made the leading considerations of the architect.*

In regard of these model houses and model lodgings, it would, I think, be a great error to estimate their benefit as merely relative to the number of persons at any one time inmates of them. No doubt it is a great advantage that they furnish, at the ordinary prices of the day, or at a still lower price, so excellent accommodation to several hundreds of persons; and it is a still greater good (particularly in regard of those established for single men and single women) that they drill their inmates into decent and orderly habits, and accustom them to a high standard of household-accommodation, which will probably influence their subsequent married lives in the same desirable direction. But, indirectly, their utility has a far wider scope. They stand in bright contrast to the dark features of filth and unwholesomeness which environ them; they familiarise the poorest classes generally with all the practical advantages of cleanliness; they show that dirt is not inevitable; they therefore create and foster among the humblest members of society a laudable discontent with defective sanitary arrangements; and they establish a strong public opinion, grounded on experience, in favour of those conditions of cleanliness and comfort which determine the maintenance of health.

That all the great results of sanitary science can be applied in their utmost perfectness to the dwellings of the

* The advantages of these admirable institutions may now be spoken of from longer experience. In a very remarkable pamphlet just published by Dr. Southwood Smith, *On the Results of Sanitary Improvement*, it is recorded that there has been no case of typhus fever in any one of the model-dwellings since they were first opened, and that their exemption from cholera has been as complete as from typhus. In the Metropolitan Buildings, during three years, the average annual mortality has been only 1·36 per cent. For a lower class of population, very similar advantages have been procured by the regulations of the Common Lodging-House Act. Dr. Smith mentions that in 1,308 regulated metropolitan lodging-houses (numbering at least 25,000 lodgers) there had not occurred a single case of fever during the quarter ending the 23rd of October; yet, before they were under regulation, 20 cases of fever have been received into the London Fever Hospital from some one single house in the course of a few weeks.—J. S., 1854.

poor, for the payment of a rent often below, and never above, the average given for some miserable doghole, that poisons its inhabitants, is a truth of immense importance, deserving the widest dissemination, and pregnant with the most hopeful promise. Such advantages spring from and illustrate the economical application of the associative principle; they cannot be obtained otherwise than by the application of capital, in such an amount as lies only within the compass of wealthy corporations, or is reached by the voluntary combination of several private purses. While the labouring classes are abundantly able to maintain these institutions when established, and to render them amply remunerative to those whose capital has first founded them, it is obvious that no power of association lying within their means can suffice to originate such work.

Model dwellings, public baths, and washhouses.

The task of initiation rests with others. And therefore it is, gentlemen, that on this occasion I have been induced to bring under your notice, as a most important part of my subject, the outline of what has been done in the matter of Model Dwellings and Public Baths and Wash-houses. Feeling assured that establishments of this nature are of infinite utility in the several respects I have enumerated; feeling assured that, beyond their immediate operation on the health of inmates and users, they also tend, by their indirect educational influence, to improve the social habits, to promote the civilisation, to elevate the general tone and character of the labouring classes, I earnestly recommend them to your attention; hoping that you may either yourselves confer on the poor population of the City the advantage of your patronage and succour in this respect, or else may transfer the matter to the jurisdiction of the Common Council, with all the influence and authority in its favour which your recommendation would insure.

From Second Annual Report.

In my last Report (under its fifth and sixth heads) I particularly solicited the attention of your Hon. Court to certain circumstances connected with the dwellings and habits of the poor, which, though they then lay apparently

out of your jurisdiction, as defined by the Act of Parliament, yet appeared to me of immeasurable weight in the sanitary fluctuations of the City, as tending in their operation constantly to thwart your endeavours for improvement, and to neutralise day by day whatever good you could achieve.

Dwellings of the poor.

I reported to you that there were sanitary defects, inherent in certain large proportions of your municipal cure, which the most absolute control of drainage and water-supply would do nothing to amend,—constructional defects of houses and of courts, whereby their crowded inhabitants were excluded from a sufficiency of light and air, and were constrained, without remission or change, to breathe an atmosphere fetid with their own stagnant exhalations. I reported to you that, however unexceptionable might be the arrangement of such localities in matters already within your control—however clean their pavements, however pure their water, however effective their drainage, yet fever and the allied disorders could never be absent from their population; while under opposite arrangements, with nuisances around them, with organic poisons rising from the soil or mingling in the water, their mortality would rise to the horrors of pestilence, and might easily renew the most awful precedents in history. I described to you the class of miserable dwellings alluded to—"Courts and alleys with low, dark, filthy, tenements, hemmed in on all sides by higher buildings, having no possibility of any current of air, and (worst of all) sometimes so constructed, back to back, as to forbid the advantage of double windows or back doors, and thus to render the house as perfect a *cul-de-sac* out of the court, as the court is a *cul-de-sac* out of the next thoroughfare." I affirmed that "this could never be otherwise than a cause of sickness and mortality to those whose necessities allot them such residence;" and assured you of the "incontrovertible fact, that subsistence in closed courts is an unhealthy and short-lived subsistence, in comparison with that of the dwellers in open streets."

In habitations of this kind the death-rate would of necessity be high, even if the population were distributed thinly in the district. A single pair of persons, with their children,

having such a court for their sole occupancy, would hardly be otherwise than unhealthy; the infants would die teething, or would live pallid and scrofulous; or a parent would perish prematurely—the father, perhaps, with typhus, the mother with puerperal fever. Judge then, gentlemen, how the mortality of such courts must swell the aggregate death-rate for the City, when I tell you that their population is in many instances so excessive, as, in itself, and by its mere density, to breed disease. Overcrowding.

Statistics can give you no conception of this crowding. If you refer to the results of the last census, you find the average population *per* house, in the City of London Union to be 7·1; in the East and West London Unions 8·8; for the construction of these averages, the most dissimilar materials are blended together; and the density of population is apparently reduced by the very large number of business-houses which have no resident inmates, beyond the porter or the housekeeper who has charge of them. If you turn from the deceptions of an average to the exact analysis of detail, you will find many single rooms in the City with a larger number of inmates than you might otherwise ascribe to entire houses. Instances are innumerable, in which a single room is occupied by a whole family—whatever may be its number, and whatever the ages and sexes of the children; where birth and death go on side by side; where the mother in travail, or the child with small-pox, or the corpse waiting interment, has no separation from the rest.

This is evil enough; but worse remains behind. It is no uncommon thing, in a room of 12 feet square or less, to find three or four families *styed* together (perhaps with infectious disease among them), filling the same space night and day—men, women, and children, in the promiscuous intimacy of cattle.* Of these inmates it is nearly super-

* I purposely refrain from any attempt to illustrate all the horrors which are incidental to this method of life; but, as a single exemplification of the text (chosen, not because of its rarity, but because it happens to occur at the moment) I insert an extract from a note, with which I was favoured a fortnight ago, by Mr. Hutchinson, Surgeon to the North District of the West London Union:

fluous to observe, that in all offices of nature they are gregarious and public; that every instinct of personal or sexual decency is stifled; that every nakedness of life is uncovered there. Such an apartment is commonly hired in the first instance by a single pair, who sub-let a participation in the shelter, probably to as many others as apply. Sometimes a noxious occupation is carried on within the space: thus, I have seen mud-larks (*chiffonniers*) sitting on the floor with baskets of filth before them, sorting out the occasional bit of coal or bone, from a heterogeneous collection made along the bed of the river, or in the mouths of the sewers; and this in a small room, inhabited night and day by such a population as I have described.

Who can wonder at what becomes, physically or morally, of infants begotten and born in these bestial crowds?

In my former Report, I drew your attention to this pestilential heaping of human beings, and suggested to you its results; and on many occasions, during the past year, complaints have been before your Hon. Court which have had their real origin in this uncontrolled evil. I revert to it because of its infinite importance. While it maintains physical filth that is indescribable, while it perpetuates fever and the allied disorders, while it creates mortality enough to mask the results of all your sanitary progress, its moral consequences are too dreadful to be detailed. I have to deal with the matter only as it relates to bodily health. Whatever is morally hideous and savage in the scene—whatever contrast it offers to the superficial magnificence of the metropolis—whatever profligacy it implies and continues—whatever recklessness and obscene brutality arises from it—whatever deep injury it inflicts on the community—whatever debasement or abolition of God's image

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"I was sent for to attend a poor Irish woman in labour, at half-past six o'clock yesterday morning, at 17, Fox and Knot Court. There were three families, each consisting of a man and wife and two or more children, in a small room, 15 feet by 8, all lying upon dirty rags on the floor. I found one of the children suffering under small-pox. The adjoining room was occupied by six grown-up persons and two children." In the circumstances to which my Report refers, scenes of this description must of necessity be *habitual*; and it is to their habit, not to their exceptional occurrence, that my remarks apply.—J. S.

in men's hearts is tokened by it—these matters belong not to my office, nor would it become me to dwell on them. Only because of the physical sufferings am I entitled to speak; only because pestilence is for ever within the circle; only because Death so largely comforts these poor orphans of civilisation. To my duty it alone belongs, in such respects, to tell you where disease ravages the people under your charge, and wherefore; but while I lift the curtain to show you this—a curtain which propriety might gladly leave unraised, you cannot but see that side by side with pestilence there stalks a deadlier presence; blighting the moral existence of a rising population; rendering their hearts hopeless, their acts ruffianly and incestuous; and scattering, while society averts her eyes, the retributive seeds of increase for crime, turbulence, and pauperism.

While I refer to these painful topics, I may remind your Hon. Court of the Report of your Committee on Health, in respect of the same heads in my previous communication, and may strengthen myself with their testimony: "We feel it due to Mr. Simon to add, from the result of personal investigation, that the statements contained in his Report under this subject, distressing as they are, are not exaggerated:" and, as regards whatever I may have recapitulated from that Report, I would beg leave to add, that my experience during the past year has confirmed the opinions which I then expressed; assuring me, more and more, that the correction of these crying evils must advance simultaneously with the other labours of sanitary reform.

Housing of the poor.

Recently, while having the honour to attend your Committee of Health in their deliberations on your Act of Parliament, I have submitted to them, as my view of what is desirable for legislation on the subject of my present section, substantially the same suggestions as I formerly laid before your Hon. Court. As their recommendations must shortly come before you for consideration, and as I entertain the deepest conviction that the subject is of paramount importance to the cause in which you are interested, I have hoped you would excuse my recurrence to it, and my brief repetition of those suggestions which the incompleteness

of your Act of Parliament has hitherto prevented your adopting.

Houses unfit for habitation.

1. There are within the City some blocks of houses which are, I fear, irremediably bad and pestilential from such errors of construction as I have already described; and which, further, are so dilapidated, as to show at a glance their little pecuniary value. In many instances the destruction of such a block of houses would confer a sensible advantage on the population of a considerable district. Of this class I could hardly give you a better illustration than would be seen in the ground plan of Seven Step Alley. There are other instances (frequent in Cripplegate) where the removal of a single house at the extremity of a court or passage would make a material difference to the ventilation of several houses, and to the health of a numerous population.

2. Again, in very many parts of the City, you find illustrations of a constructional error to which I have adverted as in the highest degree pernicious to health. You find a number of courts, probably with very narrow inlets, diverging from the open street in such close succession, that their backs adjoin with no intermediate space whatsoever. Consequently, each row of houses has but a single row of windows, facing into the confined court; and thus there is no possibility of ventilation, either through the court generally, or through the houses which compose it. In the Out-Wards of Cripplegate, Farringdon, and Bishopsgate, examples of this arrangement are both most numerous, and, I believe, most removable; but they may likewise be found in considerable numbers in the In-Wards of the City, *e.g.*, in the neighbourhood of Printing House Square, of Great Bell Alley, of Leadenhall Street, of Aldgate, of Skinner Street, and of St. Martin's-le-Grand.

In many of these cases, if the management of the property were under a single control, it is possible that effectual relief might be given, by converting any two rows of houses which are back to back, each having windows only on one side, into a single row of houses, with doors and windows both before and behind; and if changes of this nature were accompanied

by the removal of an occasional house, or other impediment to the circulation of air, I would guarantee to your Hon. Court that the next year's register would show a very large diminution in the local amount of preventable sickness and mortality.

3. In other cases, the immediate impediment to ventilation apparently consists in the operation of the window-tax. Your Hon. Court, at various times, has heard how unfortunate for the health of cities is this ill-chosen method of taxation, assessing the amount of rate for houses in proportion to their means of ventilation. You can easily conceive how much it would impede your endeavours to promote health and cleanliness within the City, if an additional direct tax were levied on houses by reason of their *drainage*, or if the assessor regulated his rate according to the *consumption of water* for household purposes. The working of the window-tax is on this principle; and although it may be very true that health is the greatest of treasures, and that, on this ground, its means and appliances are eligible for taxation, I cannot but regret that a struggling population should be tempted, by the hope of some small saving, to make a sensible diminution in their chances of life, by retrenching within the narrowest measures their inlets of ventilation and light.

Houses unfit for habitation suggested remedies.

In reference to the more important constructional errors which I have described to you, as affecting the courts and alleys of the City, it will be obvious, from the remedies which I have suggested, that no hope of alteration can be expected from landlords. To throw together the adjoining houses of two different courts, or to remove one house for the advantage of certain others, or to destroy a whole block of houses for the sake of its neighbourhood, could evidently be undertaken, as a matter of private enterprise, only where property of very considerable extent, and close juxtaposition, happened to be in the hands of a single individual; and, as regards the City of London, this is rarely or never the case. The only manner, then, it occurs to me, in which the requisite remedies could be applied, would be through the wealth and benevolence of the Corporation. If there were vested in your Hon. Court (or in any other authority of the Corporation) the power to make

compulsory purchases of house-property, on the ground of its unfitness for human habitation, it would be easy to correct the extreme errors which exist; and under a single large landlordship of this nature, it might not improbably be found that measures such as I have described would give to the localities in which they might be effected as much improvement in value as in health. After the necessary alterations, such houses would no longer need to continue under tenure of the Corporation, and the proceeds of their sale might again be applied to the reclamation of similar property in other parts of the City.

In throwing out this suggestion to your Hon. Court, I, of course, do not pretend to offer you any details for its realisation. These can more fitly be supplied by others; nor should I have introduced even this general mention of a plan, but for the vividness with which its practicability and usefulness have struck me. During my period of office, I have seen distinctly that what seems incurable in the dark intricacies of our worst courts and alleys often depends for its difficulty on the *number* of landlords, and on their mutual independence. The conviction had thus been forced on me, which I have endeavoured briefly to express to you; that the only available cure for such evils would consist in the Corporation assuming to itself (if only for a time, and in gradual succession) the proprietage of such wretched tenements, and fulfilling towards them those large and liberal duties of landlordship, which now remain unperformed through the multiplicity and neediness of petty owners. And, as a precedent for one species of such improvement, I may mention to your Hon. Court, that in such property as I have described to you, situated in other parts of the metropolis, private societies have already effected purchases which have enabled them to convert bad and unwholesome residences into the form of model lodgings for the working classes.

Before leaving the consideration of evils, in which overdensity of building and defective ventilation form such important parts, I would avail myself of the opportunity to observe, that it is of incalculable importance to preserve, for the health of the City, every open space which at present

exists. The density of buildings within the City of London Union is very great, and in the East and West London Unions, is very considerably greater than in any other part of the metropolis; and not merely are the houses closely packed together, but (as I have already described them) very thickly inhabited. Within the City of London Union, each human being, on an average, has less than an eighth part of the space he would have if residing in the district of Islington; and, small as is this pittance, it is more than double what he would enjoy if he were living in the district of the East and West London Unions. With such density of population, it would, of course, be advantageous if any space now occupied by buildings should hereafter become vacant, so as to increase the breathing-room of the neighbourhood; and your Hon. Court will see the imperative necessity of discountenancing, so far as may be, the erection of additional houses on the few unoccupied spaces which remain. In order to do this effectually, it would be desirable to procure the enactment of a clause, giving you absolute prohibiting power in this respect, whenever, for sanitary reasons, you might think it right to interfere.

Preservation of open spaces.

With respect to those evils which I have set before you, as arising from the unrestricted accumulation of persons of both sexes, and of all ages, within a single sleeping-room—dreadful as they are, I do not consider them irremediable. In the first place, I would beg you to observe, that the very restricted definition of a "lodging-house" given in your Act of Parliament, has hitherto rendered it impossible, in any degree, to regulate dwellings of the description referred to. An amendment of that definition might bring them within your control, and might enable you, not only in these instances, but in many others, to restrict the numbers of inmates, to compel the removal of persons with infectious disease, and to enforce provisions of decency, cleanliness, and ventilation.

Compulsory measures to enforce cleanliness.

Not, however, alone to restrictive and compulsory measures do I look for the social improvement of numbers, now so destitute and miserable. That our entire industrial population within the City might, in such respects, gain great

advantage from an enlightened supervision and guidance, I formerly endeavoured to show. I sought (from other experience) to illustrate the benefits they would derive, not only from your exercising habitual inspection, and possessing a more extensive control, in many matters relative to their dwellings and mode of life; but likewise, from the establishment, under the auspices of the Corporation, of institutions, which, raising before them a higher standard of civilisation, would improve their social habits by an indirect educational influence, and would elevate the general tone and character of their class.

Educational influences in promoting cleanliness.

On the subject of Model Dwellings for the labouring classes, and of Public Baths and Wash-houses, as illustrating this view, I dwelt at some length in my former Report; and, deeply convinced of the boon which their establishment would confer on the poor, I explained, to the best of my ability, the nature and the extent of their usefulness.

I now recur to the subject, only that I may repeat my profound conviction of its importance; and that in doing so, I may congratulate your Hon. Court, and may utter my deep thankfulness for the labouring and suffering poor of this great community, that, in compliance with the Standing Orders of Parliament, formal notice has been given on the part of the Corporation of the City of London, of their intention, in the approaching session of the Legislature, to apply for authority which may enable them to achieve, for their dependent fellow-citizens, this almost incalculable good.*

Model lodgings for the poor.

I cannot too strongly express the importance I attach to this implied intention of the Corporation, to establish model dwellings for the industrial population of the City. But the first and immediate operation of such an Act will, from the nature of things, hardly reach to those very destitute and degraded classes of which I have spoken. Model lodgings of the ordinary character will become the residence of men, who now pay from two to five shillings a week for such space as they occupy, and who have the habit of

* The intention of the Corporation, here spoken of, has not hitherto been carried into effect.—J. S., 1854.

sleeping in beds. To them the gain will be very great; and the example of improved domestic habits will be beneficial to their entire class. But among the lowest order which I have described to you, as it subsists in thronged and pestilent heaps within your worst quarters, there is little knowledge of beds. The first hirer of the room may possibly have a pile of rags on which he lies, with his wife and children, in one corner of the tenement; but the majority of his sub-tenants (paying for their family-lodging from sixpence to tenpence a week) lie on straw, or on the bare boards. It will be obvious to you, that no *Model* Lodging-house could be reduced to the level of their means. By those restrictions to which I have adverted, something may be done, no doubt, for improving the arrangement of houses so tenanted —something to prevent the more glaring outrages of decency which at present prevail—something to maintain comparative cleanliness, and to check the spread of disease. I fear that no further remedy than this would prove effectual, unless it were universal for the metropolis. Unquestionably, it would be possible, with persons even of the lowest sort above pauperism, to proceed on the same principle as in the establishment of model-lodgings for the working orders; to provide for them, namely, under respectable control and supervision, the best accommodation which their price could purchase, of the kind to which they have been habituated; to give them the means of lying down, free from damp or cold, partitioned from one another, and with isolation of sexes, in a building constructed or arranged for the purpose, where the ventilation and the facilities for cleanliness might be complete. There seems little room to doubt that this might be done, on a very large scale, at a rate considerably less than the poorest now pay for the right of lairage amid vermin, filth, obscenity, and fever; and with such dormitories, obviously, there might be connected other arrangements for giving comfort and cleanliness to the very poor and destitute, at the lowest possible price. Of gratuitous reception I do not speak, because that is already provided, under certain regulations, in all the workhouses of the metropolis. But while I conceive that such a measure, if

Model lodging houses.

generally adopted throughout London, would defray its own cost, and would remove evils and miseries horrid to contemplate, I cannot but feel that it would be inadmissible (in its cheapest form) as a local measure. For if the price of reception—for instance, here, were so low as to allure the wretched population in question from their places of present resort within the City, it cannot be doubted that its influence would extend beyond your jurisdiction, and would throng your dormitories with the destitute of other districts.

Ragged dormitories.

As the evil is metropolitan, so ought the remedy to be; and if there were thus instituted within each Union of the metropolis, a *Ragged Dormitory* of the nature described, I am persuaded, from my knowledge of the poorest classes, that its establishment would be of infinite advantage in improving the habits, and diminishing the mortality of those who would become its inmates.

HOUSES UNFIT FOR HABITATION.

(*From First Annual Report.*)

Houses unfit for habitation.

I have to report that there are houses and localities within the City which are irremediably bad;—places, which the uninterrupted presence of epidemic disease has stamped as absolutely unfit for human habitation; places, where drainage and water-supply, indeed, are defective, but where the perfection of these necessaries might exist, in all probability, without giving healthiness to the inhabitants. The predominant evil in the localities referred to is their thorough impossibility of ventilation.

While treating of the manner in which noxious emanations are conveyed to a distance, and are enabled to diffuse their influence over a whole town, instead of concentrating it in some single slaughter-house or burial-ground, I indirectly suggested what I have now to illustrate; that all the evils of all the nuisances in existence acquire their utmost local intensity of action when the diffusion of their gaseous products is interfered with, and when, from absence of ventila-

tion, these are retained in the immediate vicinity of their source.

The inhabitants of open streets can hardly conceive the complicated turnings, the narrow inlets, the close parallels of houses, and the high barriers of light and air, which are the common characteristics of our courts and alleys, and which give an additional noxiousness even to their cesspools and their filth. There are very few who, without personal verification, would credit an account that might be given of the worst of such dwelling-places. Let any one, however, who would do full justice to this frightful subject, visit the courts about Bishopsgate, Aldgate, and the upper portion of Cripplegate, which present some of the worst, though by no means the only instances of pestilential residence. A man of ordinary dimensions almost hesitates, lest he should immovably wedge himself, with whomsoever he may meet, in the low and narrow crevice which is called the entrance to some such court or alley ; and, having passed that ordeal, he finds himself as in a well, with little light, with less ventilation, amid a dense population of human beings, with an atmosphere hardly respirable from its closeness and pollution. The stranger, during his visit, feels his breathing constrained, as though he were in a diving-bell, and experiences afterwards a sensible and immediate relief as he emerges again into the comparatively open street.

Now, I am prepared to show that there are many, very many, courts within the City, to which the above description accurately applies ; courts and alleys hemmed in on all sides by higher houses ; having no possibility of any current of air ; and (worst of all) sometimes so constructed back to back as to forbid the advantage of double windows or back doors, and thus to render the house as perfectly a *cul-de-sac* out of the court, as the court is a *cul-de-sac* out of the next thoroughfare.

It is surely superfluous to observe that these local conditions are utterly incompatible with health. Among their dense population, it is rare to see any other appearance than that of squalid sickness and misery ; and the children, who are reproduced with the fertility of a rabbit-warren, perish in

early infancy. In the worst localities probably not more than half the children born survive their fifth year, and of the 3,763 deaths registered last year in the City of London generally, 1,410 were at or under seven years of age.

Diseases caused in houses unfit for habitation.

The diseases of these localities are well marked. Scrofula more or less completely blights all that are born: often extinguishing life prematurely; in childhood, by hydrocephalus; in youth, by pulmonary and renal affections, which you read of as consumption and dropsy, often scarring and maiming where it does not kill, and rendering life miserable by blindness, decrepitude, or deformity, often prolonging itself as a hereditary curse in the misbegotten offspring of those who, under such unnatural conditions, attain to maturity and procreation.

Typhus prevails there too, not as an occasional visitor, but as an habitual pestilence.

Habitats of typhus fever.

It is impossible for me, by numbers, to give you an exact knowledge of the fatality of such spots; because, in the greater part of the City, hospitals, dispensaries, and private practice, divide with the parochial officers the treatment of the sick, and diminish the returns of sickness which those officers would otherwise have to show. But this I may tell you, as an illustration of what I mean;—that in the few houses of Seven Step Alley and its two offsets, (Amelia Place and Turner Square,) there occurred last year 163 parochial cases of fever; in Prince's Place and Prince's Square, 176 cases—think, gentlemen, if this had occurred in Southampton Place and Russell Square! that behind the east side of Bishopsgate, in the very small distance from Widegate Street to New Street, there were 126 cases; that behind the west side, from Primrose Street to Half Moon Street, there were 245 cases; that the parish of Cripplegate had 354 cases over and above the number (probably a very large one) treated by private practitioners, by hospitals, and especially by dispensaries. Similarly, though with less perfect information, I am enabled to trace fever to a terrible extent in very many other localities of the City, even on the verge of its better residences, and close behind its wealthiest thoroughfares; in Plumtree Court, in Plough Court and

Place, in Poppin's Court, Neville's Court, Black Horse Alley, Union Court, Plough Court in Holborn, Field Lane; in the courts right and left of King Street, Smithfield, in Hanging Sword Alley and its vicinity, in Peahen Court, in Bell Alley and its neighbourhood, in Priest's Alley, in Beer Lane, in Friar's Alley, in Bromley's Buildings, and in the whole large space which stretches from Ludgate Hill to beside the river.

And in most of these localities, in addition to other sanitary errors, there predominates that particular one to which I am now inviting your attention—the absence, namely, of sufficient ventilation.

It was in districts such as these, that in the year 1665, the Great Plague of London found the readiest facilities for its reception; and it was by the destruction of such districts that the Great Fire of the following year rendered the utmost conceivable service to the sanitary progress of the people, and completed their emancipation from the horrors of an unparalleled pestilence. Long intervening years have sufficed to reconstruct these miserable habitations almost after their first type, and to re-exemplify all the evils which belong to them; so completely, indeed, that if the infection of that same plague should light again amongst us, I scarcely know why it might not traverse the City and decimate its population as quickly and as virulently as before. Meanwhile, however, typhus with its kindred disorders, and the occasional epidemics of influenza and cholera, maintain their attachment to the soil, and require no further re-inforcement from the pestilence of other climates. From these fatal diseases we no longer hope to be rescued by the recurrence of the former casualty. The almost two centuries which have elapsed since the period referred to, have taught men better methods than a general conflagration for remedying such evils; and it is a satisfaction to believe that the wisdom and humanity of the Corporation of the City of London will apply those methods with effect.

As a palliative measure, applicable in many of the least aggravated instances, I may suggest the removal of unnecessary walls which intercept the current of air from place

to place; the formation of counter-openings in various blind courts; and, not least, in regard of many houses thus situated, the admission of light and air by additional windows. I cannot pass this portion of the subject without recording my opinion that the operation of the window-tax is in direct opposition to the sanitary interests of the people; and I must venture to express my hope that some different method of assessment may presently be adopted, in place of one which presses on the occupier in proportion to the healthiness of his tenement.* I think it very desirable, indeed almost indispensable, that your Hon. Court should have the power, under certain circumstances, to order and enforce the opening of additional windows in houses occupied by large numbers of persons, when your Officer of Health may report their ventilation defective; and if it should seem expedient to you to seek this authority from the Legislature, it might with the greatest advantage be accompanied by some concession from Her Majesty's Government, to the effect that the formation of additional windows, occurring thus under your orders for the immediate necessities of health and life, should not occasion any further assessment on the occupiers of the house.

Window tax, its effects on health.

But, gentlemen, within the City of London there exist, to a very large extent, architectural evils for which no such palliative treatment is possible; evils against which I would venture to say (borrowing a metaphor from my profession) that no safety can be found except in amputation.

Houses unfit for habitation.

To dwell in hovels like pits, low-sunken between high houses, hemmed in by barriers which exclude every breath of direct ventilation—this can never be otherwise than a cause of sickness and mortality to those whose necessities allot them such residence; and, if it be an incontrovertible fact that subsistence in closed courts is an unhealthy and short-lived subsistence in comparison with that of the dwellers in

* I ought not to pass this page without a grateful mention of Lord Duncan's name in connexion with the removal of the Window Tax, at length happily effected. It remains, however, greatly to be desired, in respect of certain specifiable houses inhabited by the poorer classes, that Local Boards of Health should have power to enforce improvements of ventilation.—J. S., 1854.

open streets, then, I apprehend, it cannot be doubted that such a manner of life ought to be dealt with as a great evil, and ought as much as possible to be interrupted.

A surveyor's inspection of the City would reveal to you many places answering to the description I have given; places to which no ventilation could arrive except by removal of whole streets of houses which wall them in.

Suggested remedies.

To remove the well-constructed houses of the City, in order that its wretched courts and alleys should participate in the blessings of light and air, might seem one method of conquering the difficulty which is before you; but I apprehend the opposite alternative, of proceeding to a gradual suppression of all residence in the former class of dwellings, may more naturally have your approbation.

To the latter aim, sooner or later, the sanitary efforts of the Corporation must be directed.

There are many parts of the City where great and immediate advantage would arise from an expenditure of money applied solely to the purpose of destruction; parts, where the purchase of an entire court, or series of courts, for the sole object of pulling down houses, and leaving open spaces in their stead, would be the cheapest as well as the most effective manner of dealing with their sanitary difficulties. And I have earnestly to suggest for your consideration, that proceedings of this nature will require to be pursued to a very great extent, and at a large annual expense, within the City, before the cleanliness and habitability of its poorer localities will stand in their legitimate proportion to the modern stateliness of thoroughfare and grandeur of public buildings which attest the magnificence of the Corporation.

I would, therefore, beg to recommend that a survey be made of the worst districts which I have specified, with a view to the immediate purchase and destruction of some considerable portion of the court-property lying in them; and, still more, I would urge that this is an exertion, which for some years must proceed systematically, in order to thin the density of a population which now breeds pestilence and augments mortality by its overcrowding and excess.

I am aware that considerable difficulties lie in the way of accomplishing an object of this sort with immediate rapidity. It is my great hope, however, that the principle may be distinctly recognised: and that the City will not tolerate within its municipal jurisdiction the continuance of houses absolutely incompatible with healthy habitation. This principle being once established, and a certain annual expenditure devoted to enforce it, I feel assured that within a few years opportunities will have arisen for that outlay to have been made in the most judicious manner, and for its results amply to have demonstrated the advantages of the system which I recommend.

OFFENSIVE AND INJURIOUS TRADES.

[In touching upon a subject of such immediate commercial interest as the above, Mr. Simon insists upon principles which must always be recognised as sound. No length of usage can constitute a private right to encroach injuriously on what is essentially of public and common right. "The common right of a neighbourhood to breathe "an uncontaminated atmosphere" is indisputable, but that it requires to be insisted on at the present day is also obvious. Many of the large corporations, which, as sanitary authorities, are the guardians of the public health, are also owners of gasworks, and in that capacity they are known as the creators of some of the worst nuisances in their districts. It is impossible that they can properly discharge their duties to the public by preventing trade nuisances in the district unless they are able to show to the satisfaction of some independent authority that they have adopted the best known means for preventing the nuisances which arise from gasworks under their own management and control.—Ed.]

(*From First Annual Report.*)

Offensive trades.

III. With respect to offensive trades and occupations pursued within the City of London, my task of recommendation is an easy one. To any person conversant with the simplest physiological relations of cause and effect, it is quite notorious that the decomposition of organic matter within a certain distance of human habitations unfailingly tends to produce disease; and every one who is competent by knowledge and impartiality to pronounce an opinion on the subject, must feel that no occupation which ordinarily leaves a putrid refuse, nor any which consists in the con-

version or manufacture of putrescent material, ought, under any circumstances, to be tolerated within a town.

Slaughter-houses.

1. First, in regard to slaughter-houses, I may remind you that, on the 23rd of January last, when your Hon. Commission first met under the new Act of Parliament, I recommended to you, on sanitary grounds, that in such rules as you might make for the regulation of slaughter-houses, all underground slaughtering should be absolutely prohibited. It was laid down, however, that your Act of Parliament would not enable you to establish this restriction, which (it was argued) would be equivalent to a direct suppression of many existing slaughter-houses.*

Considering that, in my first recommendations to the Commission I ought to confine myself to objects attainable by means of the Act of Parliament then just coming into operation, I felt myself precluded for the time from entering on the subject (however important in itself) of the total abolition of urban slaughtering. Now, however, while treating generally of sanitary improvement for the City, I can have no hesitation in repeating an opinion which I have already submitted to the Health Committee of the Common Council; and I beg accordingly to state, that I consider slaughtering within the City as both directly and indirectly prejudicial to the health of the population;—*directly*, because it loads the air with effluvia of decomposing animal matter, not only in the immediate vicinity of each slaughter-house, but likewise along the line of drainage which conveys away its washings and fluid filth; *indirectly*, because many very offensive and noxious trades are in close dependence on the slaughtering of cattle, and round about the original nuisance of the slaughter-house, within as narrow limits of distance as circumstances allow, you invariably find established the concomitant and still more grievous nuisances of gut-spinning, tripe-dressing, bone-boiling, tallow-melting, paunch-cooking, &c. Ready illustrations of this fact may be found in the gut-scraping sheds of Harrow Alley, adjoining Butchers' Row,

* Slaughtering in cellars was rendered illegal by the amended City Sewers Act, 1851, and since that year has been entirely discontinued in the city. *See* page 192.—J. S., 1854.

Aldgate; or in the Leadenhall skin-market, contiguous to the slaughtering places, where the stinking hides of cattle lie for many hours together, spread out over a large area of ground, waiting for sale, to the great offence of the neighbourhood.

Such evils as those to which I have adverted are inseparable from the process of slaughtering, however carefully and cleanlily conducted; and they may easily be aggravated to an unlimited extent by defects in drainage, in water-supply, or in ventilation, or by the slovenly habits and impunctuality of those to whom the removal of filth and offal is intrusted.

In short, I believe it to be quite impossible, so to conduct the process of slaughtering within the City of London as to remove it from the category of nuisances, or to render it harmless to the health of the population: and I believe it to be equally impossible so to superintend the details of its performance as to prevent them, where ill-administered, from rising into considerable and fatal importance among the promoting causes of epidemic and infectious disease.

It is scarcely necessary, after this expression of my opinion, that I should say how strongly I would recommend that measures should be taken for the discontinuance of all slaughtering within the City; and that, with the abolition of slaughtering, all establishments which deal with animal matter approaching putrefaction, and all sheds and stalls for the continued keeping of cattle, should likewise be prohibited and suppressed.

The number of slaughter-houses at present registered and tolerated within the City amounts to 138, and in 58 of these the slaughtering occurs in vaults and cellars. How overwhelming an amount of organic decomposition must be furnished by these establishments, can neither be estimated nor conceived; but the influence of that decomposition admits of being measured in its effects on the population, and in the high zymotic mortality which denotes an atmosphere over-laden with organic poison.

Before leaving this subject, I think it right very briefly to allude to an argument which is often objected to the view here stated. The objector looks to a particular district, or to

a particular slaughter-house, and says that the mortality of the district is an average one; or he points to Mr. A. or Mr. B.—the butcher or the butcher's man, saying, "Who can be healthier than A. or B.? Surely, if the pursuit be injurious, these men ought to have been poisoned long ago." Now, to this I reply;—first, as regards the men employed in these crafts, we have no statistics of any value to decide on their mortality, and judgment on the matter cannot be deduced from some half-dozen cases, known to any of us individually; but, further, if we admit (which I by no means know to be the case) that they are persons of average longevity and healthiness, then it must be remembered that their activity, their out-door exercise, and, above all, their unlimited supply of animal food, are circumstances conducing to give them health beyond the average of their station; and it must be remembered that these palliating circumstances, though they may counteract the evil for those persons most nearly concerned in it, contribute nothing towards deodorising the neighbourhood, or towards preserving its poorer inhabitants from the depressive influence of putrid emanations.

Drainage of slaughter-houses.

And, as regards the district—although we have certain evidence that organic decomposition is a chief cause of disease, yet we do not invariably find disease generated in immediate proximity to the source of nuisance. Drainage beneath the soil, and currents of air above it, convey the materials of decomposition to a distance; and if the particular slaughter-houses be placed on a high level amidst the surrounding City, so that their drainage be effectual and their ventilation complete, then obviously their influence must be sought for, not so much in any special aggravation of the local mortality, as in certain remoter effects of their diffused emanation; in effects, namely, which are discoverable along their lines of drainage and ventilation, and in the various consequences of a highly zymotic atmosphere generally through the entire town.

2. With regard to such trades as are considered to be simply offensive, and where the evidence of injury to health s indirect and uncertain, I can hardly doubt that a wise

legislation would exclude them also from the circle of the metropolis. Tallow-melting, whalebone-boiling, gas-making, and various other chemical proceedings, if not absolutely injurious to life, are nuisances, at least, in the ordinary language of the law, or are apt to become such. It is the common right of the neighbourhood to breathe an uncontaminated atmosphere; and, with this common right, such nuisances must, in their several degrees, be considered to clash. It might be an infraction of personal liberty to interfere with a proprietor's right to make offensive smells within the limits of his own tenement, and for his own separate inhalation; but surely it is a still greater infraction of personal liberty when the proprietor, entitled as he is to but the joint use of an atmosphere which is the common property of his neighbourhood, assumes what is equivalent to a sole possession of it, and claims the right of diffusing through it some nauseous effluvium which others, equally with himself, are thus obliged to inhale. Such, as it appears to me, is the rational view of this matter; and although I am not prepared to speak of these trades in the same terms as I applied to slaughtering and its kindred occupations,—although, that is to say, I cannot speak of them as injurious to health on any large scale, yet I would respectfully submit to your Hon. Court that your Act of Parliament empowers you to deal with such nuisances in respect of their being simply offensive.*

Common right of neighbourhood to breathe an uncontaminated atmosphere.

Smoke nuisance.

3. Under the same head I would likewise beg leave to suggest whether it might not be practicable for your Hon. Court to regulate the operation of establishments which evolve large volumes of smoke. The exterior dirtiness and dinginess of London depend mainly on this cause; and the same influence, by rendering domestic cleanliness difficult and expensive, creates an additional impediment to its cultivation. People naturally despair of cleansing that which a day's exposure to the atmosphere blackens again with soot; or they keep their windows shut, breathing a fusty and unwholesome air, in the hope of excluding the inconvenience. Now, when

* City Sewers Act, 1848, § 113.

it is remembered that all the smoke of London is but so much wasted fuel, it must surely be felt that the enforcement of measures for its consumption would be to the interest of all parties; amply economizing to the manufacturer whatever might be the trifling expense of appropriate arrangements, while it would relieve the public of that which, called by the mildest name, is a nuisance and a source of heavy expense.

From Second Annual Report.

In my former Report I spoke particularly of those trades and occupations which deal with animal substances liable to decomposition; and in expressing my knowledge of their danger to the health of an urban population, I argued that no occupation which ordinarily leaves a putrid refuse, nor any which consists in the conversion or manufacture of putrescent material, ought, under any circumstances, to be tolerated within a town. To that subject I now revert, only to assure your Hon. Court that the past year has given me no reason to alter my opinion. But the trades to which I wish, on this occasion, more especially to request your attention, are those which are complained of on the ground of their offensiveness, rather than of their injury to health —as nuisances rather than as poisons. During the year, I have received a very considerable number of complaints of this nature; some of them perhaps frivolous, but many well-founded and reasonable.

At the head of this class of evils stands the flagrant nuisance of smoke. Those members of the Court who have visited foreign capitals where other fuel than coal is employed, will remember the contrast between their climate and ours—will remember (for instance even in Paris) the transparence of air, the comparative brightness of all colour, the visibility of distant objects, the cleanliness of faces and buildings, instead of our opaque atmosphere, deadened colours, obscured distance, smutted faces, and black architecture. Those, even, who have never left our metropolis, but who, by early rising or late going to rest, have had

opportunities of seeing a London sunrise, can judge, as well as by any foreign comparison, the difference between London as it might be, and London as it is. Viewed at dawn and at noon-day, the appearances contrast as though they were of different cities and in different latitudes. Soon after day-break, the great factory shafts beside the river begin to discharge immense volumes of smoke; their clouds soon become confluent; the sky is overcast with a dingy veil; the house-chimneys presently add their contributions; and by ten o'clock, as one approaches London from any hill in the suburbs, one may observe the total result of this gigantic nuisance hanging over the City like a pall.

If its consequences were confined to rendering London (in spite of its advantages) the unsightliest metropolis in Europe, to defacing all works of art, and rendering domestic cleanliness expensive, I should have nothing officially to say on the subject; but inasmuch as it renders cleanliness more difficult, and creates a despair of cultivating it with success, people resign themselves to dirt, domestic and personal, which they could remove but so temporarily: or windows are kept shut, in spite of immeasurable fustiness, because the ventilation requisite to health would bring with it showers of soot, occasioning inconvenience and expense. Such is the tendency of many complaints which have reached me, and of their foundation in truth and reason I have thorough conviction and knowledge.

Injurious effects of smoke nuisance.

I would submit to your Hon. Court that these evils are not inconsiderable; and that besides the injury to property (with which I have nothing to do), the detriment to health, if only indirect, claims to be removed. Yet, while I am cautious to speak of this latter injury, as though it were only indirect—only by its obstruction of healthy habits, I ought likewise to tell you, that there are valid reasons for supposing that we do not with impunity inhale day by day so much air which leaves a palpable sediment; that many persons of irritable lungs find unquestionable inconvenience from these mechanical impurities of the atmosphere; and (gathering a hint from the pathology of vegetation) that few plants will flourish in the denser districts of London,

unless the air which conduces to their nourishment be previously filtered from its dirt.

Smoke nuisance economically wasteful.

If the smoke of London were inseparably identified with its commercial greatness, one might willingly resign oneself to the inconvenience. But to every other reason against its continuance must be added as a last one, on the evidence of innumerable competent and disinterested witnesses, that the nuisance, where habitual, is, for the greater part or entirely, voluntary and preventable; that it indicates mismanagement and waste; that the adoption of measures for the universal consumption of smoke, while relieving the metropolis and its population from injury, would conduce to the immediate interest of the individual consumer, as well as to indirect and general economy. For all the smoke that hangs over us is wasted fuel.

Suggested remedy for smoke nuisance.

The consumption of smoke in private houses is unfortunately a matter to which hitherto little attention has been given; and it would be vain to hope that the reform should begin with those, whose individual contributions to the public stock of nuisance are comparatively trifling. With the progress of knowledge on these subjects, a time will undoubtedly arrive, and at no distant period, when chimneys will cease to convey to the atmosphere their present immense freight of fuel that has not been burnt, and of heat that has not been utilised; when each entire house will be uniformly warmed with less expenditure of material than now suffices to its one kitchen fire; and our successors* will wonder at the ludicrous ingenuity with which we have so long managed to diffuse our caloric and waste our coal in the directions where they least conduce to the purposes of comfort and utility.

* To the philosophical thinker there would seem to exist no important difficulty which should prevent the collective warming of many houses in a district by the distribution of heat from a central furnace—perhaps even so, that each house might receive its *ad libitum* share of ventilation with warmed air. Ingenuity and enterprise, in this country, have accomplished far more arduous tasks; and I little doubt that our next successors will have heat-pipes laid on to their houses, with absence of smoke and immense economy of fuel, on some such general organisation as we now enjoy for gas-lighting and water-supply.—J. S., 1854.

INTERMENTS.

[In the following extracts, which deal with a subject of great sanitary importance, and at the same time one which could only be touched upon with feelings of awe and reverence, Mr. Simon's masterly style of writing appears to peculiar advantage. It should also be noted, in connexion with his discussion of this subject from an immediately practical point of view, that a plan which had been proposed by Mr. Chadwick for working all the burials of the metropolis as a function of the Central Board of Health, and which oddly enough had been accepted by Parliament in 1850, had, in 1852, been set aside. Mr. Simon was consequently now advising his Local Authority, which was the Burial Board for the City.—Ed.]

From First Annual Report.

Intramural interments.

IV. The subject of intramural burial is the next on which I have to report, as affecting the health of the City.

In compliance with an order of the Health Committee, I have examined as fully as circumstances would allow into the requirements of the City of London in respect of burial accommodation, and the result of my inquiry obliges me to express my conviction, that the City can no longer with safety or propriety be allowed to furnish intramural interment to its dead.

In all those larger parochial burying-grounds where the maintenance of a right to bury can be considered important, —in all such, and in most others, too, the soil is saturated and super-saturated with animal matter undergoing slow decomposition. There are, indeed, few of the older burial-grounds of the City where the soil does not rise many feet above its original level, testifying to the large amount of animal matter which rots beneath the surface. The vaults beneath churches are, in many instances, similarly overloaded with materials of putrefaction, and the atmosphere, which should be kept pure, and without admixture for the living, is hourly tainted with the fœtid emanations of the dead. For the most part, houses are seen to rise on all sides in immediate contiguity to the burial-ground, forbidding the possibility of even such ventilation as might diminish the evil; and the inhabitants of such houses complain bitterly, as they well may, of the inconvenience which they suffer from this confined and noxious atmosphere.

With respect to burial in vaults, which prevails to a very great and dangerous extent in this City, I may observe that,

among persons who are ill-informed on the subject, there exist erroneous notions as to the preservation of bodies under these circumstances. They are supposed, from the complete closure of their coffins, to remain unchanged for ages, like the embalmed bodies of Egypt and Perú; or at least—if perhaps they undergo some interior and invisible change (as the chrysalis within its sheath) that there is no interference with the general arrangement, no breach in the compactness of the envelope. Nothing can be less correct than this supposition.

It is unnecessary that I should detail to you the process of decay, as it occurs within the charnel-house; nor need I inquire for your information whether indeed it be true, as alleged, that part of the duty of a sexton consists in tapping the recent coffins, so as to facilitate the escape of gases which otherwise would detonate from their confinement. It is sufficient to state, that—whether such be or be not the duty of the functionary in question, the time certainly comes, sooner or later, when every corpse buried in the vault of a church spreads the products of its decomposition through the air as freely as though no shell had enclosed it. It is matter of the utmost notoriety that, under all ordinary conditions of vault-sepulture, the wooden case of the coffin speedily decays and crumbles, while the interior leaden one, bending with the pressure of whatever mass may be above it (or often with its own weight), yields, bulges, and bursts, as surely as would a paper hat-box under the weight of a laden portmanteau.

If the accuracy of this description be doubted, let inquiry be made on a large scale after the coffins of 40 years back* —let it be seen how many will appear! If, on the contrary, its accuracy be granted, then I apprehend nothing further need be urged, to establish the importance of abolishing a

* Perhaps the expressions in my text are somewhat too general; not indeed as to the fact of the coffins *ultimately* giving vent to their fœtid contents (which is the real point at issue), but as to the time within which this occurs. In the dryer and better kept vaults, a longer period certainly elapses than that suggested; in the worse, probably a shorter one. The sooner or later is of little practical importance; but, on re-perusing my Report, I think it right to add this qualification.—J. S., 1854.

system which maintains on so large a scale the open putrefaction of human remains within places of frequent resort, and in the midst of populous habitations.

It is a very serious matter for consideration, that close beneath the feet of those who attend the services of their church, there often lies an almost solid pile of decomposing human remains, co-extensive with the area of the building, heaped as high as the vaulting will permit, and generally (as I have shown) but very partially confined. And if it be the case, as perhaps it may be, that the frequenters of the place of worship do not complain of any vitiation of their atmosphere, or perhaps do not experience it, not the less is it true that such a vitiation occurs, and—whether to the special detriment of the congregation or not, contributes to the overladen putrefactiveness of our London atmosphere.

In respect of such vaults, I do not consider that the mere cessation of burial in them will be sufficient; seeing that at the present moment they contain amongst them many thousand coffins, as yet tenanted by the materials of decomposition; and year after year, if left in their present state, these will be poisoning the air with successive instalments of their progressive decay. It seems to me quite indispensable that some comprehensive measure should be undertaken, for abolishing at once and for ever all burial within the City of London. Conjointly with the general application to Parliament, for prohibition of further intramural sepulture, I would recommend that authority be obtained by the City for its several parishes to procure the decent removal to extramural cemeteries of such coffins as already occupy their vaults; or, failing this measure, I would recommend that all coffins now lying within vaults, be walled up in their present resting-places with uniform impermeable masonry. For very obvious reasons, I should prefer the former plan to the latter.*

* Probably the most successful attempt at hermetical enclosure of organic matters would not reach beyond affecting a postponement of their diffusion through the atmosphere. The true principles for burial of the dead lie rather in recognising their decomposition as inevitable, and in providing only lest it be offensive or injurious to the living. This is best attained by interment in a well-chosen soil, at a depth proportioned to the qualities of the ground; with

Intramural burial is an evil, no doubt, that varies in its intensity according to the numbers interred; becoming appreciable in its effects on health, so far as the rough measure of statistics can inform us, only when many interments occur annually, or when ground is disturbed wherein much animal matter had previously been left to decay. But, be the evil large or little in any particular case, evil undoubtedly it is in all, and an unmitigated evil.

The atmosphere in which epidemic and infectious diseases most readily diffuse their poison and multiply their victims is one, as I have already often stated, in which organic matters are undergoing decomposition. Whence these may be derived signifies little. Whether the matter passing into decay be an accumulation of soaking straw and cabbage leaves in some miserable cellar, or the garbage of a slaughter-house, or an overflowing cesspool, or dead dogs floated at high water into the mouth of a sewer, or stinking fish thrown overboard in Billingsgate dock, or the remains of human corpses undergoing their last chemical changes in consecrated earth, the previous history of the decomposed material is of no moment whatever. The pathologist knows no difference of operation between one decaying substance and another; so soon as he recognises organic matter undergoing decomposition, so soon he recognises the most fertile soil for the increase of epidemic diseases; and I may state with certainty, that there are many churchyards in the City of London where every spadeful of soil turned up in burial sensibly adds to the amount of animal decomposition which advances too often inevitably around us.

Nor can I refrain from adding, as a matter claiming attention, that, in the performance of intramural interment, there constantly occur disgusting incidents dependent on

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no pretence of everlasting coffins and impenetrable cerements; but with ample vegetation above, to relieve the upper earth from whatever products of decay may mount and mingle there; and especially with thorough drainage below, so that down-currents of air and rainfall may freely traverse the putrefactive strata, ventilating and washing the soil, and diffusing its organic contents through deeper levels, till their oxidation is complete and their new inodorous combinations are discharged in watery solution.—J. S., 1854.

overcrowdedness of the burial-ground; incidents which convert the extremest solemnity of religion into an occasion for sickness or horror; perhaps mingling with the ritual of the Church some clamour of gravediggers who have mis-calculated their space; perhaps diffusing amidst the mourners some nauseous evidence and conviction, that a prior tenant of the tomb has been prematurely displaced, or that the spade has impatiently anticipated the slower dismembering of decay. Cases of this nature are fresh in the memory of the public; cases of extreme nuisance and brutal desecration in place of decent and solemn interment; and it is unnecessary that I should revive the record of transactions inconsistent with even the dawn of civilisation.*

From the circumstances which I have mentioned, it can hardly fail to appear most desirable to you, that the use of some spacious and open cemetery at a distance from the City should be substituted for the present system of intramural interment, and the urgency of this requirement will be demonstrated all the more cogently, when it is remembered that the annual amount of mortality in the City averages above 3,000, and that under the present arrangements every dead body buried within our walls receives its accommodation at the expense of the living, and to their great detriment.

Requirements for extramural interments.

In recommending that consideration be given, at as early a period as possible, to the means for establishing some sufficient municipal cemetery (a consideration which, for obvious reasons, must be prior to any Parliamentary proceedings for the prohibition of intramural interments) there are three points to which, even now, I think it advisable to advert, as essential to the admissibility of such a plan. I would submit, first, that the site of any such cemetery must be sufficienty remote from the metropolis to obviate any repetition of the present injury to a resident population; and I hardly know how this purpose can be attained, without going some distance beyond the immediate suburbs of

* It happened that during the few months preceding the presentation of this Report, there had occurred some of the most flagrant and disgusting illustrations of the evils adverted to.—J. S., 1854.

London as indicated by the Bills of Mortality:—secondly, that the space required for the proper inhumation of the dead of the City of London would not be less than 54 acres; and, thirdly, I would suggest that the charter of such an establishment ought to contain provisions against the erection of houses within a certain distance of the burial-ground, so that this may at all times and under all circumstances be surrounded, exterior to its wall, by a considerable belt of land totally devoid of resident population. The absence of such a provision as the last would very soon lead to the extramural cemetery becoming *intramuralised* by the growth of a new suburb around it, and would again evince, by new and unnecessary illustrations, how incompatible with each other are the Dead and the Living as tenants of one locality.

From Second Annual Report.

Intramural interments.

In my last year's Report I had occasion to represent to your Hon. Court the evils of intramural sepulture. I testified to that large accumulation of human remains, by which, in numerous parts of the City, the soil of burial-grounds has been raised many feet above its original level; and I advised you of the injury which must accrue to health from the constant organic decomposition thus suffered to proceed in the midst of our crowded population. I likewise invited your attention to the still greater evil of burial in vaults: I explained and endeavoured to remove the misconception which commonly prevails, as to the preservation of bodies under those circumstances: and I showed you how unfailingly, sooner or later after such burial, the products of putrefaction make their way from within the coffin (whatever may have been its construction) and diffuse themselves offensively and injuriously through the air. I concluded by expressing to you my strong conviction of the necessity that some comprehensive measure should be undertaken, for abolishing, at once and for ever, all burial within the City of London.

During the session of Parliament that has intervened between that Report and my present one, an event has occurred, which promises to remove effectually the evils on

which I then addressed you. Her Majesty's Government, acting at the instigation of the General Board of Health, carried through Parliament a Bill, enacting that the Queen, by Order in Council, may prohibit further burials within any district of the metropolis, so soon (after the close of this year) as the General Board of Health should have provided the means of extramural interment. The operation of this Act of Parliament is such as, I have every reason to believe, you will welcome within the City of London: and I look forward to the complete cessation of burial within your territory, as a matter for warm congratulation among all who are interested in the cause of sanitary improvement.*

Prohibition of intramural interments.

From the terms of the Act in question I find that Her Majesty's Order in Council is to be preceded by a Report from the General Board of Health, stating their opinion of the expediency, that (in any particular case reported on) burial should forthwith be discontinued. Accordingly, in the present state of the law, it will devolve on that Board to initiate whatever measures may be necessary for the prohibition of further interment in the City.

Two clauses of your Act of Parliament, which have hitherto been inoperative, may perhaps come into requisition whenever Her Majesty's Order in Council closes the burial-grounds of the City; viz., clause 89, which empowers your Commission, if you shall "think fit, to provide fit and proper places, in which the poor, under proper rules and regulations, may be permitted to deposit the bodies of their dead previous to interment:" and the following clause, which authorises your Officer of Health, in case of necessity, and for protection of the living, to cause any dead body to be removed at your expense, to whatever building may have been provided for the reception of the dead, previous to interment. It may hardly be necessary that I should trouble you with any remarks on the subject of these clauses, till such time as they are likely to come into operation.

Mortuaries.

* The Act of Parliament here referred to never passed into operation, and was repealed in 1852 by a second Metropolitan Burials Act, under which the City Commissioners of Sewers are at present acting as a Burial Board for the City of London.—J. S., 1854.

Planting of burial grounds.

With respect to the burial-grounds within the City, which will fall into disuse so soon as the new Interment Act becomes operative, I trust that your Hon. Commission will procure the power of regulating and supervising their maintenance, so that they may no longer be hurtful to the health of their vicinity. The arrangement of them, which would be most advantageous to their locality, would be that of planting them with whatever trees or shrubs may be made to flourish in a London atmosphere. The putrefactive changes, which for some years longer must proceed in these saturated soils, will be rendered comparatively harmless and imperceptible, if at the same time there advance in the ground a sufficiency of vegetation, which for its growth gradually appropriate, as fast as they are evolved, the products of animal decay.

It seems almost superfluous for me to observe, that, from the time when burials are discontinued, no unnecessary disturbance of the soil should be allowed: nor any attempts at levelling or the like, except under the direct sanction of your Hon. Court.

Advantages of keeping burial grounds as open spaces.

Another point in connexion with these burial-grounds, to which I may here advert (though I must recur to it hereafter) is, that while great advantage may be expected from the discontinuance of their former uses, if their several areas be left open and without building, so as to subserve the ventilation of their neighbourhood, all that advantage would be lost, and a heavier evil inflicted on the neighbourhood than that of which it purports to be relieved, if these spaces were at any time to be covered with houses: and I trust it may be found within the province of your Hon. Court to obtain authority for preventing any encroachment of this nature on the limited breathing-spaces of the City.

Special Report, dated December 10th, 1852.

In order to an application of the Metropolitan Burials Act by the constituted authorities of the City, you have requested me to report how far, in my judgment, the existing burial-places within this jurisdiction are fit for further reception of the dead.

Intramural interments.

I have little to add to the information which I have laid before the Commission in my successive annual reports — especially in that of 1849, and which long since induced me to express my conviction "that the City of London could no longer with safety or propriety be allowed to furnish intramural burial to its dead." *

It would, indeed, be ridiculous if I should pretend to you that this part of the subject requires any further inquiry. Putrefactive decomposition of one kind and another is the principal cause of town-unhealthiness. Against its occurrence round about our houses all your legislation is directed. The human body, once destitute of life, furnishes no exception to the laws of organic decay: under the common laws of chemical change, it soon dissolves itself into products neither less offensive, nor less poisonous, than those of any brute's decomposition. And you cannot take a juster view of the subject—you cannot arrive at stronger arguments for the immediate abolition of intramural interment, than by forcing yourselves to discard for a moment all memory of the fading human outline which masks this dreadful nuisance, and to conceive it as *a mere bulk of animal matter,* planted every year to undergo decomposition within the City, beneath our Churches, and before our thresholds.*

Dead bodies thus buried contribute importantly in their neighbourhood to the vitiation of air and water. Those that lie shelved in vaults, eventually, if not at first, spread through the atmosphere every product of their decomposition. Those that are dug into the soil have their decay modified by its

* The right of interment in the City may at present be claimed in respect probably of more than three thousand corpses *per* annum. The number actually interred of late years has, I believe, not exceeded an average of two thousand *per* annum.—J. S.

influence, mingle with its drainage the products of their transformation, and thus (as I have shown in my remarks on the Bishopsgate pump water) find their issue in the nearest land spring of the spot, polluting the drink of the population. Further, in all the more frequented burial-grounds, the soil seems to be saturated with animal matters only partially transformed; and at every new disturbance by the spade, a fresh quantity of this unctuous clay comes upmost, tainting the air with materials of fœtid decomposition, often to the great distress of persons who dwell in the vicinity.

On such grounds as these, I cannot hesitate in renewing my report that the City of London is absolutely unfit to serve as a further burial-place for the dead; and this, whether by inhumation or in vaults, whether in parochial burying-grounds, or in those of other communities.

Regard being had to the object of your reference, you would probably not desire me at present to enter on the ulterior questions of extramural interment.

On such representations as I have made, the Court of Common Council (acting under the Metropolitan Act already referred to) has authority to determine in respect of the City of London, whether the existing places of burial, either from their insufficiency or from their dangerousness to health, are so unfit for their purpose as to render it necessary that other burial-space be provided.

Should they affirm this view, they can then "authorize and direct the Commissioners of Sewers of the City of London to exercise for the said City and Liberties all the powers and authorities vested in Burial-Boards under the Act." Burial-board for the City.

This course being taken, the Commission (subject to approval from the Secretary of State) will have authority to make all arrangements requisite for the final closure of burial-places within the City.

In approaching the subject of extramural sepulture, with its innumerable details of inquiry, for site, for conveyance, and for burial—details which form the knowledge and experience of a special class of persons, the Commission may perhaps first consider, whether works so foreign to their usual functions shall be undertaken by themselves directly,

or shall be made matter of contract with existing Cemetery Companies, or other associations or individuals. Till this decision is made, it seems impossible to conjecture what topics you may wish to entertain, or within what limits the industry of your officers may most usefully be exercised.

There are many very important parts of the subject with which it may hereafter become my duty to deal; but till the preliminary questions are settled, it would be idle to detain you with sanitary considerations belonging to a later stage of your inquiry.

NOTE.

On considering the above Report, the Improvement Committee of the Commissioners (to whom the subject had been specially referred) at once resolved to report to the General Court that, in their "judgment, steps should be taken for closing the several burial-places within the City;" and at the same time they desired that the Officer of Health would prepare for them his opinion on those ulterior arrangements which such closure might render necessary.

The following Report was written accordingly.

Responsibilities of the burial-board.

Under the several clauses of the Metropolitan Burials Act, and under certain clauses of the City Sewers Act, 1848, the Commissioners of Sewers, acting as a Burial Board for the City of London, will be subject to the following responsibilities—viz.:

First,—That a sufficient extramural burial-place be provided for those classes of persons who have heretofore had right of interment within the City;

Secondly,—That the facilities of transit and conveyance to such burial-place be commensurate with the purposes for which it is established;

Thirdly,—That evil no longer accrue to the health of the City from unnecessary delays of interment, or from the keeping of dead bodies in the dwelling-rooms of the poor.

I. To measure the sufficiency of a burial-place, one must know for what numbers of population it is intended to suffice.

Burial Boards under the new Act are obliged to provide accommodation for all *parishioners* or *inhabitants* of the several parishes within their jurisdiction.

Under the term "parishioners" as relating to the City, there may be included, I am told, an indefinite number of non-resident rate-payers; and although, at first, interment might not be claimed under the latter head to any considerable extent, yet, with the completion and success of your Cemetery, the applications might year by year become more numerous. From the nature of the case, such claimants would in most instances be of the wealthier classes, and might consequently be expected to apply for special allotments of ground. It seems, therefore, desirable that you should have some knowledge of the number for whom you may thus be required to provide.

I would accordingly suggest as expedient, that a legal opinion should be obtained on your exact liabilities under the law referred to; and especially as to whether the right of burial possessed by non-resident rate-payers does likewise extend to the non-resident households of such rate-payers.

In the meantime I will leave this set of claimants out of my argument; assuming that, whenever you have reckoned their number, you will be able, on their account, to add to your general estimate, according to a fixed proportion, the assessment of whatever additional accommodation they may legally require.

The number of deaths belonging to the "inhabitants" of the City of London may be more precisely given. It would probably lie, as an average, within 3,200 per annum.

In attempting to fix the extent of ground required for your purpose in respect of this mortality, I must bring before you some preliminary considerations.

First, as regards the *minimum accommodation* to be given in your cemetery, I assume that every person buried

Cemetery accommodation.

there, however humble his previous station in life, may in death claim a grave to himself. It has been the opprobrium of our previous system that, in the poorer classes of interments, many bodies have been huddled together into a single pit. Probably you will think, as regards your future burial place, that no consideration of cheapness can justify this indecency: probably you will be unwilling that, in a presence which confounds all social comparisons, there should be drawn, with your sanction, between rich and poor, any so disrespectful distinction. But at all events, on sanitary grounds, I feel bound to assure you that these multiple burials are quite inadmissible. With such concentration of organic remains in very narrow compass, the soil grows utterly fœtid; and it becomes impossible to guard against nuisance arising to the public, or against danger to those who are occupied in digging and tending the ground. These evils, indeed, are so glaring, and the indecorum of crowded interment has long been so notorious, that nothing could have given them continuance except the necessities of our narrow accommodation under the system of intramural burial; and it would of course be without excuse to perpetuate them under the changed circumstances of extramural Cemeteries, where space can so readily be obtained for all legitimate requirements of the public. So far as the experience of other countries may help to determine your judgment in this matter, I may inform you that, in every foreign interment system which can deserve to be considered an establishment of public authority, the right of single burial is universally recognised.

Next—as regards the *succession of interments,* according to the burial-usages of modern times, no public Cemetery with fixed limits can be permanently useful, except on a full recognition of the fact that it is a decaying place for the dead, not a place for their embalmment or mummification. For hence it follows, that ground once used for burial becomes equally fitted for a second use, whenever by gradual decomposition the bodies first interred there have thoroughly vanished from the soil.

This principle has given the common rule of burial, and for obvious reasons. Under any other plan, the entire area allotted for interment would presently be in holding. No portion, however remote the date of its first occupation, could be resumed for a second series of interments; and the provision of a new Cemetery would be indispensable. Pushed to its extreme consequences, such a system must eventually convert the entire country into its burial-ground.

Under the practice of intramural interments—that practice which the new law supersedes, the principle of temporary tenure has been made to cover all manner of brutal abuses. Graves have been disturbed—within metropolitan churchyards and other burying-grounds, in which the transformations of decay had not half accomplished themselves; and public decency has been outraged—here, in the centre of civilisation, by the spectacle of human remains being tossed about like offal. It is one chief advantage of extramural sepulture, that, while the inevitable decay of the dead will be removed from the vicinity of the living, and the latter will no longer have their atmosphere tainted by this hideous contamination; so likewise for the dead—however humble, that in this new resting-place, room will be allotted them with no indecent stint; that the dwellings and market-places of the living will no longer hem them in, grudging their narrow requirements; that their return to dust will be respected, as beseems the last phase of mortal existence; and that, against any desecration of their repose, there will be given every security which piety and affection can demand.

There may be difference of opinion as to the precise time when a grave can with truth and decency be thought to have become distenanted. The rapidity of decay varies in so extraordinary a degree according to soil, that some inhumations are almost equivalent to embalming; while, in other cases, the process is comparatively rapid. Only experience of a particular soil will enable you to know with precision, what length of tenure is needed there for the purposes of interment to accomplish themselves; but on general principles one can approximate pretty nearly to the

truth. Assuming the site of your Cemetery to have been selected with due regard to those qualities of soil which determine the differences adverted to, I think it unlikely that any adult grave can properly be re-opened within 20 years* of the time when interment shall last have occurred in it. Very long within this time, however, all soft textures of the body would have completed their decay. Remains of the coffin and of the skeleton,—materials insusceptible of putrefaction, would alone occupy the grave, and with gradual crumbling blend themselves in the soil. Not till this final disintegration of the skeleton is complete,—not till the identity of its different elements is destroyed, can the first occupant of a grave be fairly deemed to have abdicated his tenure. From this time only, can his interest in it be held as having reverted to the public, for whoever next may claim a similar usufruct of the ground.

Taken for granted that, as regards the general public, your Cemetery will be established on the principle of a temporary tenure of graves, it remains for you to determine to what extent you will permit wealthier applicants to purchase exemption from this rule, and obtain a freehold interest in particular portions of your ground. I have little to say on this point, because it is of no sanitary importance, provided that privileges so purchased do not in any degree interfere with the general economy of your plan. Barring any risk of this kind, it comes before you simply as a question of finance.

A precaution, however, which I would suggest, is, that, first of all, you should provide a cemeterial space sufficient for the interment purposes of your population, on the principle of temporary tenure; that no portion of this space should, under any circumstances, be alienated from its public destination; that the whole of it should remain in perpetuity

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* Twenty years would probably represent at least four times the average period during which the bodies of the poor have been left at rest in many graveyards of the metropolis. Yet I would willingly advocate a longer term of years as the personal tenure of a grave, if public opinion would sanction the heavier expense which must thus be entailed on the living.—J. S.

the common burying-ground of the City of London. This prime necessity of your plan being secured, it will be competent for you to include in your purchase a certain redundant number of acres; and out of these you can allot, at your discretion, such quantities of ground as may be desired in freehold, either for the purposes of family interment, generation after generation, or for the fiction of perpetual tenure by some single occupant.*

In thus selling portions of your land for private and privileged employment, you would be satisfying what has become a habit, and may be considered a legitimate claim of the wealthier classes. Beyond this, it is also evident, that you would virtually be competing with the ordinary Cemetery-companies of the metropolis, in the most lucrative department of their trade. It would probably be easy for you, by varying your fees according to circumstances, either on the one hand to diminish, and almost prohibit, the frequency of applications for exceptional interments; or, on the other hand, to attract such applications. Even, if you thought it desirable, you might admit purchasers from other

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* In regard of these exceptional burials, it will be requisite to fix certain regulations; especially for the construction of family graves, wherein it will be desired that many who during life have been united, shall after death have their ashes mingled together in the soil. A frequent custom in private Cemeteries for fulfilling this purpose has been, for graves to be dug to a considerable depth —sometimes such that twelve coffins could be piled there, one on the other; and these deep pits have commonly been provided with brick walls. Now, for the same reason as determined my opinion against the multiple burial of the poor, I would argue against this arrangement, as one which might occasion excessive accumulation in single spots of your Cemetery, and as being in principle bad. In preference, I would venture to recommend the endeavour to introduce an interment-custom, which is prevalent abroad, of *family plots of ground instead of family pits.* Under ordinary circumstances, all the accommodation heretofore sought in the one arrangement would be found superiorly in the other; and in a well-projected suburban Cemetery the larger superficial extent could probably be afforded at much less cost than is usually paid for the pit. Persons familiar with the details of Cemetery-burial would easily devise an arrangement of such plots, whereby they should be separate and secluded, admitting of appropriate decoration, and altogether likely to prove more acceptable to public opinion than many existing arrangements. In regard of such plots, too, there might be conceded a privilege which I believe has not been allowed in private Cemeteries; namely, an hereditary right to refill the ground for any successive number of times, subject only to such restrictions as will determine the succession of interments in other parts of the Cemetery.—J.S.

classes than those having right of burial in your municipal Cemetery;—in short, you might manage it commercially, with a view to profit, looking to its proceeds for covering many expenses of the general establishment.

With respect to the ordinary arrangement of your ground for public purposes, and the distribution of burials therein, you may estimate that, taking one grave with another, and allowing for the marginal spaces of each, the average size of a grave will be twenty-eight square feet. For illustration's sake, I will suppose the ground to be laid out in plots —say the third of an acre in extent. Each such plot would contain four hundred single graves, mixed adult and young, with what foot-paths might be requisite for approaching them. The City mortality of twenty years (assuming this period to be the ordinary leasehold of a grave) might be reckoned at sixty-four thousand deaths; for the accommodation of which number there would be wanted one hundred and sixty plots of the above-mentioned size—say fifty-four acres of ground. I would propose that throughout each line of every such space, adult and infant graves should, as far as possible, lie alternately; and that, instead of filling all the graves together at stated periods (say every twenty years) half of them, taken alternately, should be filled at each semi-period—say every ten years. By this arrangement, half the complement of burials would take place in each plot, at a time when the decomposition of the preceding half-complement had finished itself, so far as putrefaction is concerned; and whatever contamination of air might be liable to occur under the best-considered sanitary arrangement, would certainly be reduced to the lowest conceivable amount. Or, as an alternative equal to this arrangement for the purposes of health, you might adopt the plan of filling in immediate succession all the burial spaces of a plot, provided the surface could then at once be devoted to the growth of appropriate vegetation.

Fifty-four acres being then the quantity of ground which would suffice, on sound principles, for the ordinary interment of your entire annual mortality during a period of twenty years; at the expiration of which time (assuming your soil

to be appropriate) one may reasonably expect that the ground will admit of a second similar occupation; and so forth in perpetuity: it will be requisite to add a considerable allowance of space for other accessory purposes.

Thus, room would be required for the various buildings that belong to the institution of a Cemetery: partly for the dwelling of such officers as you may require to be there resident, partly for the temporary accommodation of persons resorting thither for the burial of their friends, partly for the religious services of different congregations.*

Something likewise must be added for such mainways as will be wanted along various lines of the burial-ground, for the carriage traffic which belongs to funeral ceremonies among the richer classes of society, and for other like purposes.

Further, I dare say you would think it inexpedient that your Cemetery should be entirely without decoration and elegance. Fifty-four acres of head-and-foot stones, or the same extent of bare mounds, might vulgarise even the aspect of death. By the judicious introduction of trees and turf and shrubs, of bends and undulations, you would probably seek to interrupt the long perspective of so many tombs, and, by these artificial resources of planning and planting, to enhance the native solemnity of the spot. Amid such ornamental portions of your ground might be scattered irregularly the various sites of exceptional interment,—family graves, personal graves in perpetuity, long leasehold graves, and the like; and the interposition of these large portions of comparatively unoccupied soil, with as much appropriate vegetation as could conveniently be introduced, might not only allow much tasteful decoration of the ground, but would likewise conduce to the healthful accomplishment of those purposes for which the Cemetery is established.

In respect of these and many other details of your plan, you will doubtless be guided by the direct and responsible

* The distinction of the ground into a consecrated and an unconsecrated portion, as required by the Act of Parliament, will require no addition to its total area; and therefore the proportion which these parts should bear to one another need not now be discussed.—J. S.

advice of men specially skilled in the subject. I have, therefore, confined myself to the mention of those points which may determine your judgment merely as to the quantity of land required for your purpose.

Without offering any opinion as to the possible claims of non-resident parishioners, on which liability I would again suggest your obtaining a legal opinion; and without pretending to advise what allowance should be made for purely decorative purposes; I may yet conclude from such information as I have collected, that, with a hundred acres of suitable soil at your disposal, you would be amply able to meet all legitimate burial-requirements of your population in perpetuity, and would likewise (for many years at least) have a considerable excess which might be applied to the uses of ornamental arrangement.

From what I have said on the influence of soil, in determining the period after which burying-grounds may be resumed for a second series of interments, it will be obvious to you that this condition is an important element in deciding the sufficiency of any area for given burial purposes. And the site of your Cemetery might be such as somewhat to lessen, or greatly to increase, the suggested extent of your estimate. It would be fruitless, however, now to detain you with any endeavour to trace the several influences which different soils exert over animal decay. Such remarks, at the present time, could only be addressed to hypothetical cases, or stated in the most general form. Therefore, instead of attempting this anticipative argument on the subject, I hold myself ready to report to you, specifically, on the suitableness of whatever soil may be proposed to you for the purposes of your Cemetery.*

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* For similar reasons, I defer any discussion of the depth at which bodies may most properly be deposited in the ground. The thickness of superjacent soil, which will deodorise, before their escape, the gaseous products of any given decomposing mass, or which will retain these gases more or less permanently in combination, varies most importantly with certain chemical and mechanical qualities of the soil: and on these it would be useless to dwell by anticipation. For accurate results, it may be necessary, after the selection of a site and during its preparation, to institute experiments on the subject.—J. S.

There is yet one other consideration which may affect the extent of your purchase. The law restricts you from approaching within 200 yards of any dwelling-house, without the previous written consent of its owner, lessee, and occupier. But there is no law restricting the nearness within which any builder may approach your wall with his design for new habitations; and it might easily occur to you, within a short time of establishing your Cemetery, to find a new town growing in close proximity around it. If there be any meaning and value in the clause, which forbids your undue approach to inhabited houses—if it truly represent that this approach would be a sanitary evil, then obviously the law is deficient in the respect adverted to. It would be in your power to guarantee the continuance of a belt of unoccupied ground, as an immediate circuit to your Cemetery, in either of two ways:—either, namely, you might purchase a considerable extent of ground beyond the actual requirements of your Cemetery, might devote its central hundred acres to interment, and might let its remaining circumference for agricultural purposes; or, if you were fortunate enough to be treating for the central portion of some considerable estate, you might stipulate, as a condition of purchase, that no building should be reared within such distance of the wall of your Cemetery, as you, on due consideration, may deem fit.

Accessibility of burial-ground.

II. In the provision of a Cemetery, it is required by the Act of Parliament, that "the Burial Board shall have reference to the convenience of access thereto from the Parish or Parishes for which the same is provided;" and it is legalised, that "any Burial Board may make such arrangements as they may from time to time think fit, for facilitating the conveyance of the bodies of the Dead from the Parish, or the place of Death, to the Burial-ground which shall be provided."

It cannot but be obvious to you, that the choice of a site for your Cemetery might be such as to interpose very serious obstacles in the way of interment, even for the richest classes; and under the most favourable circumstances, the removal of the dead to a distance of some miles from

their previous residence, cannot but threaten serious difficulty to the poor. Assuming—what various conditions of the Act of Parliament render almost inevitable, that your Cemetery must be distant at least six miles from the centre of the City, the present funeral charges can hardly be maintained without increase, if the traffic is to be conducted on the same principles as heretofore. The price for which an artisan could procure a decent funeral for his wife or child, within a stone's throw of his door, will unavoidably be augmented by every mile you add to the distance, if the conveyance is still to depend on the old means and arrangements.

When I consider the classes of persons likely, as inhabitants of the City, to claim interment in your Cemetery—classes, among which the predominance of narrow, if not necessitous, circumstances, will be frequent; when, for instance, in a year's official returns, I see that artisans and paupers make more than two-thirds of your entire classified mortality; I cannot but think this aspect of the matter a very important one. From some years' experience of your death-register, I should say that, of City funerals, there would not be one in ten where the friends could afford to disregard an additional expenditure of half a guinea; and, in the majority of instances, I am persuaded that a smaller addition would be enough to cause inconvenience and distress. It therefore seems to me certain that your plan for extramural sepulture, however perfect at all other points, might either entirely fail of its purpose, or become cruelly oppressive to the poor, by the simple expensiveness of approaching the burial-place. And I suppose it was in anticipation of the difficulties here adverted to, that the framers of the Metropolitan Burials Act introduced the permissive clause, which I just quoted, empowering Burial Boards "to facilitate the conveyance" of the dead, and thus virtually rendering them responsible, so far as the poorer classes are concerned, for the cheapness and efficiency of such conveyance.

I would therefore submit, that in your decision as to the site of your Cemetery, so soon as the indispensable

conditions of appropriate soil are given, the first point to examine is accessibility; that the spot to be chosen should have, in addition to its carriage roads, the utmost facility of railway approach: and that, for those with whom small differences of price are an important consideration, you should be able to guarantee a rate of transport for coffin and mourners, not in excess of existing charges.

From observation of arrangements which have lately been made with Railway-Companies by the Directors of Cemeteries, and from inquiry of persons engaged in such undertakings, I entertain little doubt that you might make a contract to the following effect with the authorities of any line convenient for your purpose—viz., that every day, at a fixed hour, there should be a train, or some portion of a train, exclusively adapted to the funeral purposes of the poorer classes; that for this train there should be issued funeral tickets, franking the conveyance of a coffin with some stated number of mourners, who should also be entitled to return; that the introduction of funeral traffic should be by a special entrance, and its exit at a special terminus.

Such contract supposed,—in connexion with this funeral train, you might further arrange to maintain public hearses; which, at the option of persons concerned, and on due requisition being made, should convey any coffin from its former home to the railway terminus; and which again, if necessary, at the distal station, should complete its conveyance to the grave. This facility might even be extended, if the distances were considerable, to the similar conveyance of a certain number of mourners, with the undertaker in charge of their procession.

Also, if desirable, it could no doubt be arranged, with a view to economy, that the undertaker's responsibility for a funeral should terminate at the railway terminus, up to which he would have conducted it; and that its reception at the distal station should be entrusted to servants of your Cemetery, who would then fulfil all remaining duties in respect of it.

Arrangements to the above effect would be much simplified in working, and their general adoption much promoted, if all disbursements for funeral tickets, and for such other facilitations of conveyance as I have adverted to, were made by your Burial Board,—their cost to be included in an uniform Cemetery fee; so that the friends of the deceased, after paying for his grave, should, without further payment, be entitled, if they desired it, to claim conveyance for his coffin from home to the Cemetery, and for themselves (in stated number) by a funeral ticket, at least for the railway portion of their transit. Thus to have one single and inclusive price for all that belongs to the new system—for the extramural grave, namely, and for conveyance thereto, would enable your Burial-Board to maintain its total cost at a level within reach of the poorer classes, and probably below that of existing prices.

In addition to what I have here suggested, there are many other steps which might be taken, if unforeseen circumstances should render them necessary, to diminish the pressure of new burial-charges on the poor. Time will develop, better than one can foretell, the exact operation of our reformed system; and for such inconveniences as it may bring, you will have no difficulty, I think, in finding appropriate cures. Nor could it be otherwise than easy, if you thought it desirable, to extend to the comparatively few funerals of wealthier classes which occur from within the City of London, those same arrangements for facilitating conveyance, which I have here deemed it requisite to consider only in their relation to the poor.

For the latter, it has seemed indispensable that your scheme should provide assistance, equivalent at least to the difficulty which its adoption must occasion them. Beyond this, I believe you would wish to disturb as little as possible the ordinary routine of interment; and I have aimed, therefore, at suggesting assistance only in such kind, and in such degree, as may least interfere with any interests of trade, least derange any established habits, least offend any prejudices of the people.

III. There is no part of the subject which I have considered with more anxiety than that which relates to delays of interment, and to the prolonged keeping of dead bodies in the rooms of their living kindred.

Need for mortuaries.

Evils arising in this source are unknown to the rich. Soldered in its leaden coffin, on tressels in some separate and spacious room, a corpse may await the convenience of survivors with little detriment to their atmosphere.

Not so in the poor man's dwelling. The sides of a wooden coffin, often imperfectly joined, are at best all that divide the decomposition of the dead from the respiration of the living. A room, tenanted night and day by the family of mourners, likewise contains the remains of the dead. For some days the coffin is unclosed. The bare corpse lies there amid the living; beside them in their sleep; before them at their meals.

The death perhaps has occurred on a Wednesday or Thursday; the next Sunday is thought too early for the funeral; the body remains unburied till the Sunday week. Summer or winter makes little difference to this detention: nor is there sufficient knowledge on the subject, among the poorer population, for alarm to be excited even by the concurrence of infectious disease in a room so hurtfully occupied.

I have no means of telling you, with statistical precision, in how many of your annual deaths the corpse is detained in dangerous proximity to the living. But I have already quoted an official classification of deaths, by which it would appear that more than two-thirds of your deaths are of the artisan class or below it. Among them, at least, it would be exceptional for the corpse to have a room to itself. On an average, then, there would probably be lying within the City at any moment, from thirty to forty dead bodies in rooms tenanted by living persons.

This very serious evil is well known to all persons who have taken an interest in the sanitary advancement of the poor; and ineffectual endeavours have been made for its diminution. The law does indeed empower your Officer of Health, under certain circumstances, to order the removal

of a corpse from any inhabited room. And, under the Nuisances Removal Act, the General Board of Health may be authorised, during times of epidemic disease, to issue directions and regulations for the speedy interment of the dead. Both laws have remained inoperative, and are likely to remain so.

If one were starting anew—legislating for a people with unformed habits, nothing might be easier than to devise regulations of a perfect kind with regard to the sanitary management of the dead. But our case is widely different. The evils against which we have to contend are among the deepliest-rooted habits of the country. In defence of what exists there are many stupid and ignorant prejudices: but, interwoven with these are feelings of tenderness and affection, to which all consideration and reverence are due;—feelings which would be shocked and outraged by any abrupt endeavour to reduce the care of the dead to a system of fixed regulations.

For myself, having the deepest sense of the evil in question, and having officially the power to order the removal of the dead, I may repeat that I have never yet exercised my authority. Practically speaking, I can hardly conceive an instance in which I should attempt to do so. It would require the strongest case that could be shown of actual mischief in progress—of disease and death multiplied day by day through the presence of some particular dead body, to justify interference even in that single instance. Nothing like the operation of a general law would be tolerated;—nothing like including the dead in a compulsory plan of hygienic police.

After very careful consideration of the subject, I may confess myself even more impressed with its difficulties than when I first began to give it my attention; and in the few suggestions which follow I cannot pretend to do more than intimate where, in my opinion, a beginning may usefully be made towards an improvement which it will take many years to accomplish.

Legislative remedies, proposed for the evils which I am bringing under your notice, have been of two kinds—viz.

first, to restrict the time during which it should be lawful to keep a body unburied; *secondly*, to promote the use of reception-houses (as they have been called) whither bodies might be removed from within all dwelling-places, and be kept under certain regulations during the days preceding their interment.

As regards the first point;—there are many foreign countries (and even some parts of the United Kingdom) where either law or custom has made it imperative to bury within two, three, or four days of death. Our habit, unfortunately, is to keep the corpse unburied for twice as long. A week may probably be considered our medium interval between death and interment; and with this delay, I need hardly tell you, the body becomes putrid—sometimes intensely so, before the time for its removal arrives.

Among the wealthier classes, as I have said, this delay is practically unimportant; except in so far as every repetition maintains the pernicious custom. Scarcely on account of any risk arising to themselves in emanations from the dead, but mainly for the sake of influence and example, would one wish the educated classes of the community to adopt the usage of earlier burial. Our present practice is upheld by no law of necessity; nor for the most part does it represent any extravagance of grief, or fond reluctance of separation. Chiefly it subsists by our indolent acquiescence in a habit, which former prejudices and former exigencies established. Fears of premature interment, which had much to do with it, are now seldom spoken of but with a smile. The longer interval, once rightly insisted on as necessary for the gathering of distant friends, has now, in the progress of events, become absurdly excessive: in a vast majority of cases, all whose presence is needed, live within a narrow circle; and the more distant mourner, who, fifty years ago, would have spent several days in coming from Paris or Edinburgh, can now finish his journey in twelve hours. It is much to be wished that, under these changed circumstances, an altered practice might ensue in the upper classes of society, fixing their time of burial within three or four days of death. Such example of wealthier neighbours, aided by greater enlightenment and

education among themselves, would greatly tend to detach the poor from many observances and delays, in relation to the dead, which, in their narrow dwellings cannot continue with impunity.

But, as regards these poorer classes, cannot anything be done in connexion with your new arrangements, to abridge the period of delay? As for any positive regulation, limiting the time during which it should be allowed to retain dead bodies in certain dwelling-houses—such could only be enforced by an extensive organisation of sanitary police, which you would have to call into existence for the purpose, and which, in the present state of public opinion, would encounter insurmountable difficulties on every occasion of its authoritative interference.

It is by indirect means and inducements alone, that I can hope at present to effect the desired alteration; and by them, I think, something can be ensured towards shortening the delays of interment.

Heavy cost of burials to the poor.

First, I believe that everything which cheapens the cost of burial, will conduce to such a result; for, among the poor, one considerable cause of procrastination must often be the immediate absence of money. The plan of conveyance and payment which I have suggested, would at least ensure you against any increase of this difficulty, and might readily be applied to diminish it. For, under such a system of single payment for grave and conveyance, it would be practicable, and, I think, most advantageous, to fix two prices, with a difference of at least five shillings between them; to charge the lower fee whenever the funeral should occur within eighty hours of death, the higher whenever this period should be exceeded. If, by the general adoption of the former alternative, the Cemetery receipts should be diminished in respect of artisan funerals, even to the utmost extent—say five or six hundred pounds per annum—this money, or much more, would have been advantageously expended in purchasing so great a reform. If, on the contrary, the immediate option of the working classes should be in favour of continuing a system so injurious to themselves and to their neighbours, there would be no injustice in leaving them

the incumbrance of a cost, from which it would require only their own will to escape. The difference of price would soon be recognised as a municipal tax on delays of interment;—a tax, rendered legitimate by the public evil which it is designed to correct, and guarded against remonstrance, because any man may avoid it who will. And since the delays in question often arise in a passive habit of the people, founded on no deliberate intention or reason, I cannot but believe that a well-marked difference of fee would, as it were, startle the poor into considering the question, which would come to be of daily argument in their houses:—"Is it worth while that our funeral cost should be increased by the amount of one or two days' wages in order that we may retain within our dwelling-rooms four days longer, that which everyone tells us is hurtful to ourselves and to others?"

It has been suggested to me, that many delays occur owing to Sunday being considered specially as a funeral-day among the labouring classes; that an equal distribution of burials over the week would be preferable to this waiting for a particular day; and that the closure of your Cemetery on Sundays might accordingly be beneficial for the purposes under consideration. Many arguments will doubtless occur to you, both for and against the desirability of Sunday interments; but this probably may be regarded as a point of detail, more fitly to be considered when your scheme is complete, or even when it has actually given you some experience of its operation.

Mortuaries or reception houses for the dead.

As regards the second point adverted to—the establishment of special reception-houses for the dead, I do not hesitate to say that, if they could be brought into general use, their institution would confer great advantages on the poor. But against this event, at least as an immediate one, I grieve to see strong probabilities.

A first proposal made to some mourning household, that they should trust to strangers' hands the custody of their unburied dead, would in most instances greatly and suddenly clash with their customs, and prejudices, and affections. What-

ever success you might have in conquering this difficulty would of necessity be slow: and my practical familiarity with the poorer classes makes me so little hopeful of their immediate acquiescence in the plan that I should hardly feel justified in urging you to incur any very large expense, or to embarrass yourselves at starting with any elaborate machinery, for the sake of so scanty an expectation.

The reception-houses of Germany, as you probably know, are founded with a double intention; partly for the purpose which I am here chiefly considering—that the dead may be removed from an injurious contiguity to the living; partly also, that the bodies may be vigilantly observed, in case of suspended animation. With the latter view, many of them are specially furnished and specially officered. In that at Frankfort, for instance, each body is placed in a separate, warmed and ventilated cell; cords are attached to the fingers in such manner that the slightest movement occasions the ringing of an alarum; night and day watch is kept in a central apartment which looks into each cell, and has the several alarum-bells hung round it; adjacent is a room designed for acts of resuscitation, with bath, galvanic apparatus, and the like, always in readiness for instant use; and, so long as any corpse lies within the reception-house, the medical superintendent of the establishment never goes beyond its walls. Dr. Sutherland, whose report to the General Board of Health is full of interesting information on the burial-institutions of the Continent, praises the completeness and ingenuity of these contrivances; adding, however, that "after careful inquiry at all the cities where he found them to exist, he could not learn that any case of resuscitation had as yet occurred." I may add too, as regards my own personal experience, in this country, that, with extensive opportunities, it has never happened to me, either to see any case of suspended animation where doubts of death and question of interment could arise, nor to hear in professional circles of any such occurrence. I therefore think it quite unnecessary to recommend any arrangement of reception-houses, with reference to the resuscitation of persons apparently dead.

The object for which I would desire their institution, is exclusively that of receiving dead bodies out of the houses of the poor, in order to mitigate those evils which arise in prolonged retention of the corpse. That this object is in itself very desirable, and that under the prevalence of epidemic disease its accomplishment might be of urgent necessity you will not doubt: and the responsibility for fulfilling it—or at least for giving all facilities to its fulfilment, is so distinctly imposed on you by the letter and spirit of the law, that you will probably wish to take measures accordingly.

The extent, then, to which my information on the subject would lead me to recommend provision to be made, is this: I would advise that accommodation of an appropriate character (savouring in style rather of an ecclesiastical construction, than of the workhouse or dissecting-room) be arranged for the reception of fifty coffins. For this purpose I would suggest—not the building of several separate reception-houses within the City of London, in order to their being respectively adjacent to the portions of population which might use them,—but rather the establishment of one only, and that on the site of your Cemetery. Thus the conveyance of bodies which would take place under your auspices, might be made with greater economy, since it could work into the plan I have already suggested. The advantage of having only a single edifice (especially since its use is likely to be limited) and of including its superintendence in the general organisation of your Cemetery, cannot be questioned. And it seems to me, likewise, that a building designed for the reception of many dead bodies, cannot conveniently be established in the heart of the City.

I would of course recommend that the use of this building should be entirely optional with the poor, and that its advantages should be allowed gratuitously to persons burying in your ground: so that any one who, in respect of his cemetery-fee, would be entitled to have a corpse conveyed thither for funeral purposes, might claim this conveyance as soon as he chose after the occurrence of death, and might have the coffin

kept with all proper formalities in the reception-house, till the moment fixed for its interment.

Responsibilities of the burial-board.

On further particulars connected with this part of your arrangements, I do not think it requisite at present to dwell; especially because, while I regard the establishment of a reception-house to be quite indispensable to the complete fulfilment of your new responsibilities, I still look upon it as an institution to be gradually developed in the course of years, and according to circumstances yet undetermined, rather than as something which ought at once to assume its permanent character and proportions.

Here, too, in concluding this introductory report, I may observe that I have endeavoured as far as possible to avoid encumbering it with detail. For myself, in its construction, I have thought it indispensable to pursue the subject into minuter ramifications, to consider a vast number of circumstances here scarcely mentioned, to make myself acquainted with the burial customs of other countries, to review a great variety of opinions and arguments which have been advanced on the several matters alluded to, and to consult with persons practically versed in them. But to have brought all this material before you, would have prolonged my report to an inconvenient extent with no proportionate utility.

Further, as regards these details of the subject, there are many parts on which I cannot address you with the confidence that belongs to personal knowledge. The general principles which I have set before you, do indeed lie within range of my official and professional observation. But the next stage of your inquiry relates to matters of special pursuit with which I am only indirectly conversant: and whatever information I may have compiled for myself from other sources, you will probably best obtain at first hand. Practical experience in the construction and working of Cemeteries has now for many years been the growing knowledge of persons connected with their administration by ties of business, or by official appointment. In many instances it has been dearly purchased, and notorious failures have arisen from its absence. Regard being had to the magnitude of your undertaking—

hitherto unprecedented in the country, and to the immense interests involved in your success, I cannot but earnestly hope that such experience may be made available for your information.

At an early period you will have to determine what appointments will be requisite, with a view to the architectural and other designs of your Cemetery, to its economical planning and decorations, to the superintendence of its daily working, to its financial management, to the conveyance of bodies, and to all intramural organisation connected therewith. Minute details will be best considered when these appointments are made, and when you will naturally have the benefit of such practical experience as may best assist your deliberations.

For the task on which you are engaged extends, I need hardly say, far beyond the purchase of certain acres for your burial ground. It implies for its completion, that you shall possess an adequate plan on which the interment of your population may be managed during many succeeding generations; a plan constructed, first of all, with entire regard to the general good of the public, and next, with as little violence as may be to those habits, prejudices, and interests, which are involved in the present system of interment.

The construction of such a plan constitutes a very large question of municipal policy;—one which, because of its solemn subject, and because of the degree in which human feelings and affections are involved in it, requires to be handled with peculiar discretion and delicacy; but which not the less requires to be contemplated in a large and comprehensive manner.

I have therefore thought I should best fulfil the object of your reference by bringing before you those general principles which lie at the root of all minute considerations: in order that, having first determined on them, and having taken one collective view of the subject, you may better know at what time, and in what order, and to what extent, you would wish the minor details to be developed for your information.

CHOLERA.

From Fifth Annual Report, dated November 29th, 1853.

Asiatic cholera in Europe.

Two years ago — adverting to the non-completion of metropolitan sanitary works, on which the health of entire London is vitally dependent, I could not but comment on the utter unpreparedness with which the metropolis was awaiting any sudden return of Asiatic Cholera. It was indeed impossible to foresee how soon, or how late, that dreadful visitation might recur to desolate our homes — whether it might return at once, or never. But typhus — averaging in fifteen years double the fatality of that rarer epidemic—was adding day by day to its list of preventable deaths; and other endemic diseases were co-operating with it, demonstrably, uninterruptedly, to decimate, impoverish, and abase the people.

Whatever doubts might have existed as to a return of the foreign pestilence were soon solved: whatever hasty conclusions had been formed, as to its again remaining absent during half a generation, were soon disappointed and reversed. Even while I was addressing you on the subject, the plague had again kindled its smouldering fire, and was widening its circle of destruction. Perhaps from the eastern centres of its habitual dominion—from the alluvial swamps and malarious jungles of Asia, where it was first engendered amid miles of vaporous poison, and still broods over wasted nations as the agent of innumerable deaths; or perhaps from the congenial flats of Eastern Europe, where it may have lingered latent and acclimatised; the subtle ferment was spreading its new infection to all kindred soils. Repelled again from the dry and airy acclivities of the earth, and their hardier population, it filtered along the blending-line of land and water—the shore, the river-bank, and the marsh. Conducted by the Oder and Vistula from the swamps of Poland to the ports of the Baltic, it raged east and west, from St. Petersburg to Copenhagen, with frightful severity, and, obedient to old precedents, let us witness its arrival at Hamburg.

Twice in the European history of Cholera, had this town seemed the immediate channel of epidemic communication to our island; the disease having on each occasion commenced in our north-eastern sea-ports within a very short time of its outburst there. A third time, not unexpectedly has this dreadful guest, following the line of former visitation, touched upon the banks of the Tyne; where* a worse than beastly condition of the crowded poor, and sewage-water diluted through the people's drink, had prepared it an appropriate welcome.

Next, the disease was rumoured to be in London. Hope and belief are too near akin for this not to have been doubted and denied; but the last few weeks have shown, with sad incontrovertible certainty, that after only four years' absence, Cholera has again obtained its footing on our soil. Six or seven hundred deaths, registered in the metropolis since the beginning of September, have already attested its presence.

Anxiously adverting to the future, and asking what may be the onward progress of the disease, we can appeal only to a narrow experience. Before us lie the records of but two complete visitations of the disease, and the commencement of this the third. It would be a shallow philosophy that should pretend, from two observations, to predict the possible orbit of this obscurely wandering plague.

Yet I dare not disguise from you that such knowledge as we have, to justify scientific anticipation, is pregnant with threats and gloom. For—let me remind you of the past. At each former period of attack, the infection, after a certain course over Continental Europe, struck upon our eastern coast in the summer of an unforgotten year. In the northern parts of Great Britain, so soon as it had lit among the population, each time it burst forth into explosive activity, and worked its full measure of destruction without delay. More faintly it reached the South. On each occasion, indeed, at the close of summer, London was sensibly affected by the disease; but,

* Having had recent occasion to examine judicially into the matters here adverted to, I think it proper to mention that the allusions in my text were long prior to this examination, and were founded chiefly on the Registrar-General's Reports of the time, with other official statements.—J. S., 1854.

we hoped, under a milder infliction. Here and there, within its Bills of Mortality (as at Tooting in 1848) there was thrown some astounding flash on a particular hot-bed of co-operating poison; but on the whole it seemed to the sanguine, on each occasion, that the fury of the epidemic was expending itself in our northern towns, and that the metropolis was to be comparatively spared.

The behaviour of cholera epidemics.

Each time, at the commencement of the new year, our London mortality from Cholera seemed stationary within the limit of a few hundred deaths. Each time winter and spring allowed a long respite to our invaded City, and confirmed the omens of the hopeful.

But each time there was disappointment. Each time, as the warmth of summer requickened the exterior conditions of chemical activity, the dormant fire kindled afresh—slowly at first, but with speedy acceleration of rate. Each time, in the few weeks before Michaelmas—amid almost universal threatenings of the disease, and amid such panic of death as the metropolis had not known since the Great Plague, there suddenly fell many thousands of the population.

Scientic prediction of phenomena can arise only in the knowledge of laws.

Thus then our position stands. Scientific prediction of phenomena can arise only in the knowledge of laws. That the phenomena of this disease, however capricious they may seem, are obedient to some absolute uniformity as yet beyond our ken—are enchained by that same rigid sequence of cause and effect which is imposed on all remaining Nature—it would be impossible to doubt. But these conditions are hitherto unknown to science. Hitherto we can speak of the facts alone, with a short empirical knowledge of their succession. Yet in this light, such as it is, the conclusion is only too obvious. If the disease, already notorious for a tendency to return on its former vestiges, repeat on this third occasion the steps of its two previous courses; or, perhaps I should rather say, if it now proceed consistently to complete a repetition which it has already half-effected; Asiatic Cholera will be severely epidemic in London in the third quarter of next year—will proceed, with a stern unflattering test, to measure the degree in which those promises of sanitary improvement have been redeemed, which

the terror of its recent visitation extorted even from the supinest and most ignorant of its witnesses.

In the face of so great a danger, you will reasonably claim of your Officer of Health that he shall report to you, how far the City is already fortified against this dreadful invasion—how far the hygienic defences of life, if weak, may be strengthened—how far there remain breaches now insusceptible of repair.

The habitats of cholera.

1. It forms an all-important part of these considerations for resistance to the disease, to recognise quite accurately what is its fashion of attack. Since I last addressed you on the subject, in my Report for 1849–50, the materials for correct generalisation have been very largely increased by Dr. Farr's admirable Report to the Registrar-General on the Cholera in England, and by numerous other important publications. By collating with these works the more restricted, yet not uninstructive, experience which arose within your particular jurisdiction, I hope to have enlarged my knowledge of the subject, and to have become able with greater confidence to submit my conclusions for your acceptance.

The first and most obvious characteristic of the disease is its preference for particular localities. It is eminently a district disease. And the conditions which determines its local settlement are demonstrable physical peculiarities.

After carefully reviewing the subject, I do not know that I need qualify, except to express more confidently, the account I formerly gave you of those peculiarities, as consisting in the conjunction of dampness with organic decomposition.

It is in respect of these conditions—especially among dense urban populations, that the level of occupied ground, relatively to the nearest water-surface, becomes of primary importance. The low level, in itself, or rather in respect of the watery dampness which it implies, is not enough to localise the pestilence. To be afloat at sea might be the safest lodging.

The sub-district of St. Peter's, Hammersmith, averages only four feet above high-water level; that of St. Olave's, Southwark, two feet higher; yet among the former and worse placed of these two populations, the Cholera-mortality

was only 18 per 10,000; while among the latter and better placed it rose to 196—multiplying nearly 11 times the minor phenomena of a lower level. So also within your own jurisdiction. Side by side along the river lie four of your sub-districts; three at the elevation of twenty-one feet, one at the elevation of twenty-four feet. The Cholera-mortality, if simply proportioned to level, should have been nearly the same for these four sub-districts, but somewhat less in the last one than in the first three. Yet contrary was the fact; for in two of these sub-districts the Cholera-mortality, for equal numbers of population, was $4\frac{1}{2}$ times as great as in the other two.

It would, therefore, appear that in certain low-lying levels —to constitute them favorable soils for the disease, there must be joined to their first condition of lowness (with the mere watery dampness which it implies) some other and second condition; one, which is of extreme frequency in such districts, though not essentially present there.

This second condition impends wherever there dwells at such levels a certain density of population; *it mainly varies with the degree in which that dense population lives in the atmosphere of its own excrements and refuse.* In this respect I cannot refrain from saying, that the giant error of London is its present system of drainage. Probably in considerable parts of the metropolitan area, house-drainage is extensively absent: probably in considerable parts, the sewers, from the nature of their construction, are very doubtful advantages to the districts they traverse: but the evil, before all others, to which I attach importance in relation to the present subject, is that habitual empoisonment of soil and air which is inseparable from our tidal drainage. From this influence, I doubt not, a large proportion of the metropolis has derived its liability to Cholera. A moment's reflection is sufficient to show the immense distribution of putrefactive dampness which belongs to this vicious system. There is implied in it that the entire excrementation of the metropolis (with the exception of such as, not less poisonously, lies pent beneath houses) shall sooner or later be mingled in the stream of the river, there to be rolled backward and forward amid the

Cholera a filth disease.

population; that, at low water, for many hours, this material shall be trickling over broad belts of spongy bank which then dry their contaminated mud in the sunshine, exhaling fœtor and poison; that at high water, for many hours, it shall be retained* or driven back within all low-level sewers and house-drains, soaking far and wide into the soil, or leaving putrescent deposit along miles of underground brick-work, as on a deeper pavement. Sewers which, under better circumstances, should be benefactions and appliances for health in their several districts, are thus rendered inevitable sources of evil. During a large proportion of their time they are occupied in retaining or re-distributing that which it is their office to remove. They furnish chambers for an immense fæcal evaporation; at every breeze which strikes against their open mouths, at every tide which encroaches on their inward space, their gases are breathed into the upper air—wherever outlet exists, into houses, foot-paths, and carriage-way.

To you, gentlemen, as Commissioners of Sewers for the City of London, these remarks may seem superfluous; the rather so, as the worst evils of tidal drainage are not largely exemplified within your jurisdiction. But it seems to me of extreme moment at the present time, when very costly improvements of the metropolitan drainage are about to undergo parliamentary discussion, that the public should be well aware how indispensable such improvements are for the general health of London, and how important, in fact, they are to thousands who at first sight might think themselves little interested in their completion.

To some individual householder, dwelling at a high level, all concern in the subject may seem to terminate with the defluxion of his own sewage. So that his own pipes remain clear, little cares he for the ultimate outfall of his nuisance! Perhaps, if he knew better, he would care more. His gift returns to him with increase. Down in the valley, whither his refuse runs, converge innumerable kindred contributions.

* I am informed that in large districts on the south side of the river, this retention of sewage is prolonged for two-thirds of every tide—16 hours out of every 24.—J. S.

From city and suburb—from an area of a hundred square miles covered by a quarter of a million of houses, with their unprecedented throng of metropolitan life, there pours into that single channel every conceivable excrement, out-scouring, garbage, and refuse, from man and beast, street and slum shamble and factory, market and hospital. From the polluted bosom of the river steam up, incessantly though unseen, the vapours of a retributive poison; densest and most destructive, no doubt, along the sodden banks and stinking sewers of lowest level; but spreading over miles of land—sometimes rolled high by wind, sometimes blended low with mist, and baneful even to their margin that curls over distant fields. For, not alone in Rotherhithe and Newington—not alone along the Effra or the Fleet, are traced the evils of this great miasm. The deepest shadows of the cloud lie here, but its outskirts darken the distance. A fever hardly to be accounted for, an infantile sickness of undue malignity, a doctor's injunction for change of air, may at times suggest to the dweller in our healthiest suburbs that, while draining his refuse to the Thames, he receives for requital some partial workings of the gigantic poison-bed which he has contributed to maintain.

The subject of these remoter effects I refrain from pursuing, as foreign to my present purpose. That on which I wish to insist is the character of the river in its relation to the marginal sub-districts which it habitually dampens and occasionally floods with putrescent soakage, and in its relation to the sewers of low gradient which it converts (often with their adjoining soil) into the similitude and hurtfulness of cesspools. I wish emphatically to point out that the several parts of London have suffered, and are likely again to suffer, from Cholera, in proportion as either this malarious influence is exerted on them or other kindred miasms are furnished by their soil. And it is my belief, from such evidence as is before me, that the general liability of London to suffer the epidemic visitation will cease whenever an efficient and inodorous system of drainage, conveying all refuse of the metropolis beyond range of its atmosphere, shall be substituted for our present elaborate disguise of an unremoved

nuisance. I deem it right to state this explicitly: not only because it is my duty to give you, in simple truth, the conclusions to which I am led by careful reflection on the facts; but likewise because—for the credit of sanitary medicine and for your justification in the awful presence of a recurrent pestilence within your jurisdiction—it ought to be thoroughly known how much of the cause is common to the entire metropolis, and has not admitted of removal by measures of partial improvement. And the circumstances will, perhaps, excuse me if I repeat to your Hon. Court—represented as you are both in the Metropolitan Commission of Sewers and in Parliament, where this question must shortly be discussed—that the universal reform of our metropolitan drainage, at whatever imaginable pecuniary cost, is an urgent claim and necessity, unless this great city is again, as two centuries ago, to live under the constant alarm of increasing epidemic destruction.

Reverting, however, to the more especial relations of the disease within your territory, you will remember that, among your four bank-side sub-districts, two suffered in marked excess; their Cholera-mortality having been 4½ times as great as that of the other two. The fact is instructive; because those two suffering sub-districts (though not of lower mean level than the others) were marginal to the valley of the Fleet, and were, therefore, exposed, more than any other part of your province, to the class of evils I have described. For a considerable part of this locality may be regarded as but recently* a creek of the Thames; its shelving banks, singularly foul from ancient misuse, though now built over and paved, undergo in their lower levels very considerable soakage; while those vast sewers which lie in the mid-channel of the former river are more liable than any within your jurisdiction to suffer injurious interference from the action of the tide. At every such interference, and at every current of air setting up the sewers, all gases generated in these large chambers would

* New Bridge Street was built over the Fleet in 1765. The present site of Farringdon Street had been arched in 30 years earlier, for the purposes of the Fleet Market.—J. S.

diffuse themselves, not only in the low level, but likewise widely east and west, up those important slopes which depend on this valley for their drainage. I can easily understand that the radical cure of this district may be possible, only as part of those metropolitan improvements to which I have adverted; but I do think it of supreme importance, in reference to any such visitation as we dread, that during the next twelve months there should be taken every precaution which technical knowledge can suggest for restricting, even by palliative and temporary expedients, those mischievous effects which I have endeavoured to illustrate.

In describing to you the local affinities of Cholera, I have intimated that, in its preference for our low metropolitan levels, it selects these soils specifically in respect of their being damp with organic putrefaction. A moment's consideration will suffice to show that, if this be true, the higher levels of the metropolis will be exempt from the disease only in proportion as they exempt themselves from the local conditions which invite it—only in proportion as they avail themselves of those natural advantages which their situation enables them to command. Let a district be defective in house-drainage, so that its soil is excavated by cesspools and sodden by their soakage; let its sewers be ill-constructed and foul, so that offensive gases are ventilated into the immediate breathing-air of the inhabitants; let its pavement be absent or imperfect, scattered with refuse and puddled with water;—you will easily conceive that, under these circumstances, all distinctions of level are merged in the strong identity of filth, and whatever diseases belong to putrefactive dampness of soil will strike here as readily as on the low-lying mud-banks of the river.

So, likewise, in still narrower limits—the predisposition of a house to Cholera may be stated in the same terms as define the liability of a district—viz., that the humid gases of organic decomposition, in proportion as they are breathed into one house in a district more than into other houses there, will engender the greater liability of that house, as compared with its collaterals, to suffer an invasion of

Cholera. And thus it often happens, during epidemic prevalence of the disease, that sporadic cases are determined in localities which might generally claim to be free from infection : for, what avails it to be on the highest ground and the best soil, with every neighbouring facility of sewers and scavenage, if, owing to individual carelessness and filth, the conditions of dampness and putridity are by choice retained within a house, and its basement flooded with rotting liquids, or piled with accumulated refuse ?

I might give you many instances in illustration of these points—showing you how, under the operation of specific sanitary faults, the Cholera-mortality of districts acquires an artificial exaltation; but few comparisons will suffice. At the period of the epidemic of 1849, your best conditioned sub-district was the north-west of the City of London Union; and (among those of the same level) your worst was the sub-district of Cripplegate, which at that time was in a very unsatisfactory state, abounding in open cesspools and their consequences. In the former of these sub-districts the Cholera-mortality *per* 10,000 was 19; in the latter 47; and it is easy to show that additional sanitary errors soon develop a larger fatality. Not far from your boundary, at the same level with these two sub-districts, in the Hackney Road division of Bethnal Green, it rose to 110; this large mortality being principally confined to a very small portion of the district, wherein (the local Registrar reports) sewers were almost entirely absent, houses were contaminated with the filth of years, streets were remaining for days uncleansed from accumulating dirt, and all waste water (including animal secretions) was uniformly thrown into the public way.

Such are the conditions under which, at any imaginable height in the metropolis, Cholera may decimate a population: such, in their worst form, were the conditions which at Merthyr-Tydvil—several hundred feet above the water-level, carried the Cholera-mortality to more than double the high metropolitan rate just mentioned. Taught by this case the power of human mismanagement to futilise the favours of Nature; taught that perverse ingenuity can construct poison-

beds for the development of Cholera, high above the usual track of its devastation; one gladly turns from the horrible instructiveness of such a lesson, to gather the kindred evidence of contrast: and happily there is abundant evidence to show how much may be effected, even in the most tainted districts, to purchase a circumscribed exemption from the disease by the judicious application of sanitary care.

Prophylactic measures for cholera.

In the remarks which I have made on the local distribution of Cholera, you will have observed that I dwell particularly on one class of sanitary evils as concerned in its production; on that class, namely, which consists in the retention and soakage of organic refuse — on that class, which has its appointed antidote in a system of inodorous drainage, of uninterrupted pavement, of complete and punctual scavenage.

On this I particularly insist, because I believe that here is the very atmosphere without which Cholera would cease.

Sanitary evils abound; and, if I were speaking of other diseases, I might have more to say of other causes. I am unwilling, even for a moment, to seem indifferent to those remaining fertile sources of suffering that surround the poor of our metropolitan population—to their over-crowded condition, to their scantiness of ventilation, to their insufficient or disgusting water-supply, to their frequent personal dirt, to their habitually defective diet. These several influences have their own characteristic sequels and retribution, on which I have often addressed you, and which I am little likely to underrate; believing, as I do, that, in the lapse of years, the aggregate of their effects is far more fatal than any periodical epidemic visitation. Likewise, I cannot doubt that, under certain circumstances, and in respect of particular cases, they may assist the operation of the choleraic poison. Nor will I pretend so exactly to limit the affinities of that which evolves this poison, as to deny that rooms, fœtid with animal exhalations, may (like cesspool-sodden cellars) be ready to answer the stimulus of its infection. And at any rate, I think it highly important to recognise that all sanitary defects which embarrass the excretive purification of the human body — whether by breathing or otherwise, do naturally tend in the same direction as the causes of Cholera,

and are liable—if only by indirect means, to become accessory in its destructive work.

The specific causation of cholera.

But, deeply impressed as I am with the importance of these considerations, I esteem it of still higher consequence, if measures are ever to be taken for an effective prevention of the disease, that the principle of its *specific causation* should be steadfastly kept in view. What may be the exact chemistry of this process, I do not pretend to say: urging only, that, in all human probability, the poison arises in specific changes impressed by some migratory agent upon certain refuse-elements of life. Perhaps, nowhere, and certainly not before your Hon. Court, can it be desirable, in the present immaturity of pathological knowledge, to argue as to the first origin or absolute nature of that wandering influence which determines in particular localities the generation of epidemic malaria. Simply, since it leads to all-important practical conclusions, let this distinction be recognised: that which seems to have come to us from the East is not itself a poison, so much as it is a test and touchstone of poison. Whatever in its nature it may be, this at least we know of its operation. Past millions of scattered population it moves innocuous. Through the unpolluted atmosphere of cleanly districts, it migrates silently, without a blow: that which it can kindle into poison, lies not there. To the foul, damp breath of low-lying cities, it comes like a spark to powder. Here is contained that which it can swiftly make destructive,—soaked into soil, stagnant in water, griming the pavement, tainting the air—the slow rottenness of unremoved excrement, to which the first contact of this foreign ferment brings the occasion of changing into new and more deadly combinations.

These are matters which it is hateful to hear, and, believe me, to speak about. But the thing is worse than the statement; and I would suggest to you this easy test of its reality. Take at random any consecutive hundred entries of Cholera-Deaths in the Registrar-General's metropolitan returns, where local conditions are described; and let any man decide for himself, whether what I have sketched in general terms convey more than the essential features of

these several records. In 1849, such an atmosphere as these influences engender existed continuously and intensely on the low-lying south side of the river, and to some distance inland, from Greenwich to Wandsworth; it existed also continuously, but in far less intensity, and with comparatively little extension inland, along the northern side of the river from Poplar to Chelsea, and it existed very intensely in several independent centres, scattered about those healthier levels of the metropolis, which, by their better position, ought to have been exempted from such a reproach. The Cholera struck in the same proportion as this atmosphere prevailed; and herein, I repeat, lies that definite local condition, except for which—to the best of my knowledge and belief, the migratory ferment (whatever it may be) would pass harmlessly through the midst of us.

For, towards the chemical constitution of local atmospheres, it seems that the several principles of epidemic diseases stand in the same sort of fixed respective relations, as do the several principles of infective fevers towards certain elements in the blood of individual persons. Just as the infective ferment acts on man, so appears the epidemic ferment to act on locality. We know that, in a given group of human beings, small-pox chooses one victim, scarlatina another, measles a third, by reason of some material quality in each person respectively, which his blood possesses, and which his neighbour's blood does not possess. By virtue of this quality —not the less chemical because chemists have no name for it, that specific exterior agency, which we call infection, has the power of affecting each such person—has the power of producing in him a succession of characteristic chemical changes which tend to an eventual close by exhausting this material which feeds them.*

Strictly analogous to this, in its principle of choice and in its method of operation, appears the epidemic action—not

* For the scientific reader, I may perhaps be permitted to add, that the very difficult subject, at which here I can only venture to glance, is discussed at some length in one of my Pathological Lectures, delivered at St. Thomas's Hospital in 1850, published at that time in the *Lancet*, and subsequently reprinted.—J. S., 1854.

on persons indeed, but on places. The specific migrating power—whatever its nature, has the faculty of infecting districts in a manner detrimental to life, only when their atmosphere is fraught with certain products susceptible, under its influence, of undergoing poisonous transformation.

These products, it is true, are but imperfectly known to us. Under the vague name of putrefaction we include all those thousand-fold possibilities of new combination, to which organic matters are exposed in their gradual declension from life. The birth of one such combination rather than another is the postulate for an epidemic poison.

Whether the ferment, which induces this particular change in certain elements of our atmosphere, may ever be some accident of local origin, or must always be the creeping infection from similar atmospheres elsewhere similarly affected; whether the first impulse, here or there, be given by this agency or by that—by heat, by magnetism, by planets or meteors—such questions are widely irrelevant to the purpose for which I have the honour of addressing you. The one great pathological fact, which I have sought to bring into prominence for your knowledge and application, is this:—that the epidemic prevalence of Cholera does not arise in some strange cloud of venom, floating above reach and control, high over successive lands, and raining down upon them without difference its prepared distillation of death; but that—so far as scientific analysis can decide, it depends on one occasional phase of an influence which is always about us—on one change of materials which in their other changes give rise to other ills; that these materials so perilously prone to explode into one or other breath of epidemic pestilence, are the dense exhalations of animal uncleanness which infect, in varying proportion, the entire area of our metropolis; and that, from the nature of the case, it must remain optional with those who witness the dreadful infliction, whether they will indolently acquiesce in their continued and increasing liabilities to a degrading calamity, or will employ the requisite skill, science, and energy, to remove from before their thresholds these filthy sources of misfortune.

2. If, gentlemen, I have detained you long in stating conclusions as to the habits of the disease, and as to the significance of its local partialities, it has been in order to render quite obvious to you the intention of those precautionary measures which it is now my duty to recommend.

Prophylactic measures for cholera.

First, I would allude to influences of an exterior and public kind; and here, all that I have to advocate might be included in a single stipulation, that cleanliness—in the widest sense of the word—should be enforced to the full extent of your authority.

Over the pollutions of the river, and over the tidal exposure of its malarious banks, you have no power.

Whether for the relief of your low-lying districts—subject to imminent risk from causes I have described—there can be found any temporary protection to save their atmosphere from contamination, is a question which you will resolve upon other judgment than mine.

Along the river-bank there is one especial source of nuisance which has repeatedly been under your notice, and which is likely to become of serious local import under the presence of epidemic disease. I refer to the docks, and chiefly to that of Whitefriars. I mention it particularly, not only because the accumulations of putrid matter there have often been alarmingly great, but likewise because, at the head of this dock, during the former invasion of Cholera, there was remarkable prevalence of the disease; and I can well remember how often the offensive condition of the dock was accused, not unjustly, of contributing to the mortality of the neighbourhood. The fœtid materials, floated into these several recesses of the river, and left stranded there by the receding tide, are often so copious as to produce very objectionable effects on the atmosphere which surrounds them; and I would beg leave strongly to urge that such sources of nuisance should be thoroughly and permanently removed.

Further—from what I have said as to the conditions of our vulnerability by Cholera, you will be prepared to think it of great importance that, during the next six months, you

should be certified on the state of your sewers, in every part of the City, as to their greatest possible cleanliness and least possible offensiveness of ventilation. Fifty miles of sewer, reticulated through the City, sufficiently attest your active desire to provide for the complete and continuous carrying away of all excremental matters: and you will excuse me, I hope, in consideration of the anxieties of my office, if I seem superfluously cautious in reminding you that the test of successful sewers lies in an inodorous fulfilment of their duty, and that every complaint of offensive emanations indicates, in proportion to its extent, a failure of that sanitary object for which the construction was designed.

There is one precaution—always of great value to the health of towns, and especially useful against any malarious infection, which happily I find it needless to recommend. The paving of all public ways within the City—including every court and alley—is already so complete as to constitute a very favourable point in your sanitary defences. In order that this excellent arrangement may give its full fruit, it will be requisite—though this again I need hardly press on your consideration, that the duties of scavengers and dustmen be thoroughly and punctually performed.

Again, I would particularly advise that great vigilance be exercised in all markets, slaughtering-places, and other establishments under your jurisdiction, to prevent the retention of refuse-matter, animal or vegetable. I would urge the strictest enforcement of all regulations which you have made for the cleanliness of such places, and for the removal of their putrefiable refuse.

Likewise, I have to suggest that after the month of May, at latest, no disturbance of earth to any considerable depth should be allowed to take place, either in your works or in those of gas and water companies, except under circumstances of urgent necessity. In the lower levels of the City, particularly, I conceive this prohibition to be a matter of paramount importance; because the soil, never of unexceptionable cleanliness in towns, is here especially apt to be of offensive quality.

Prophylactic measures for cholera.

On the subject of water in its general relations to the City, I have only again to express my deep regret that it lies out of your present power to compel a continuous supply, and that your means are restricted to choosing what may best compensate for the absence of this sanitary boon. It must be your aim to mitigate, so far as may be, the evils that belong to an ill-regulated intermittent system in its adaptation to the houses of the poor—evils which imply, as I have often told you, not only much domestic dirt, but likewise a frequent suspension of all efficiency in the drainage of innumerable houses. With a view to the best alternative for a continuous supply, I would recommend that at least a daily filling of all cisternage take place, and expressly that Sunday form no exception to the advantages of this rule. If a choice of evils must be made, I trust it is no heathen's part to urge that the Christian Sabbath suffers more desecration in the filth and preventable unwholesomeness of many thousand households, than in the honest industry of a dozen turncocks. I likewise submit, that it would be highly advantageous to the labouring poor, most of whose domestic cleansing is reserved for the last day of the week, that, on that day, a second delivery of water should take place at some hour in the afternoon.

I wish it were in my power to tell your Hon. Court that the supply of water to the City of London had become, in quality, all that I think it might be rendered. Such as it is, however, there depend other very important issues on its being delivered in ample abundance for all the purposes of cleanliness; and I am glad to have learned from the eminent engineer of the New River Company that he has it in expectation very shortly to be able to furnish to the City a largely increased and practically inexhaustible supply.

The subject of water in its district relations ought hardly to be passed without a word of caution as to the use of pumps within the City. I need hardly inform you that every spring of water represents the drainage of a certain surface or thickness of soil, and that—such as are the qualities of this gathering ground, such must be the qualities of the water. You will, perhaps, remember that in my

account of one celebrated City pump, which sucks from beneath a churchyard, I showed you 90 grains of solid matter in every gallon of its water. In virtue of that wonderful action which earth exerts on organic matter, the former contents of a coffin, here re-appearing in a spring, had undergone so complete a change as to be insusceptible of further putrefaction: the grateful coolness, so much admired in the produce of that popular pump, chiefly depending on a proportion of nitre, which arises in the chemical transformation of human remains, and which, being dissolved in the water, gives it, I believe, some refrigerant taste and slight diuretic action. Undoubtedly this water is an objectionable beverage in respect of its several saline ingredients; but my present object in adverting to them is rather to illustrate an anterior danger which they imply. Their presence indicates a comparative completion of the putrefactive process, effected by the uniform filtration of organic solutions through a porous soil.* Let that soil have frequent fissures in its substance, or let its thickness be scanty in proportion to the organic matters to be acted on: and the water, imperfectly filtered, would run off foul and putrescent. Now this risk, more or less, belongs to all pumps within the City of London. They draw from a ground excavated in all directions by sewers, drains, cesspools, gas-pipes, burial-pits. The immense

* This very important influence, exerted by the earth on various organic infiltrations, is referred to in the text only under one point of view; only as it occasions the deterioration of land-springs in urban districts, and renders their water unfit for consumption. But the subject has another equally important side. Such springs, having their waters laden with nitrates, represent the continuous removal of organic impurities which otherwise would contaminate the air. The evil of spoiled springs, therefore—while it necessitates for every urban population that their water-supply should be artificially furnished from a distance, has great countervailing advantages. A given organic soakage will cease to vitiate the atmosphere by evaporation, in proportion as it gravitates to lower levels and undergoes those chemical changes which accompany filtration through the soil. Hence it is evident that, for the healthiness of inhabited districts (where extensive soakage of organic matters is almost invariable) it becomes most important to maintain, or by artificial measures to accelerate, this down-draught through the soil; and the reader will scarcely need to be reminded that, in those improvements of metropolitan sewerage, which it is a chief object of this Report to advocate, complete provision for the continuous drainage of soil is implied as an essential part.—J.S.

amount of organic matter which infiltrates the soil does undoubtedly, for the greater part, suffer oxidation, and pass into chemical repose: but, in any particular case, it is the merest chance whether the glass of water raised to the mouth shall be fraught only with saline results of decomposition—in itself an objectionable issue—or shall contain organic refuse in the active and infectious stage of its earlier transformations. Some recent cutting of a trench, or breakage of a drain in the neighbourhood, may have converted a draught, which before was chronicly unwholesome, into one immediately perilous to life. Such facts ought to be known to all persons having custody of pumps within urban districts; and it ought likewise to be known that this infiltrative spoiling of springs may occur to the distance of many hundred yards.*

In final reference to the quality of water, whether supplied by our trading companies or derived from springs within the City, I think it expedient to mention that, against its lesser impurities, great protection is given by filtration through animal charcoal, as in various "filters and purifiers" which are before the public. These protective means do not lie within reach of the poorer classes; nor, whatever their accessibility to individuals, can any such personal arrangements render it less important to provide that water—the first necessary of life—be supplied for universal use in its utmost procurable purity.

Beyond the above points, which are of general application within the City, all your remaining precautions will relate to the condition of private houses: and of these—occupied by the poorer classes, there exist in the City some thousands over which it will be requisite, by repeated inspection, to maintain an efficient sanitary watch. From circumstances to which I have already referred, it appears that your defences

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* For a fact strikingly illustrative of this, I am indebted to my colleague, Dr. R. D. Thompson, Lecturer on Chemistry at St. Thomas's Hospital. At Liverpool, in three wells which he examined, distant severally 760, 800, and 1,050 yards from the Mersey, he found the water brackish from marine soakage, containing four or five hundred grains of solid matter per gallon, and totally unfit for consumption.—J.S.

against Cholera will very mainly consist in removing the causes of disease from within individual houses; and it is only by an organised system of inspection, for detecting and removing every unclean condition, that this object can be attained. For your encouragement in this task, I may venture to express my belief that, throughout a considerable portion of the City, the local affinities for Cholera are not too strong to be greatly modified and obviated by such a system.

With respect to this important work of sanitary inspection, what I now propose is no new proceeding with the City. More or less since the date of my appointment, but I hope with gradual increase of completeness and efficiency, weekly visitations on a considerable scale have been made, under my direction, by your four Inspectors of Nuisances. Acting under your authority, and guided by what information I could obtain on the existence of endemic disease* in your several districts, I have furnished the Inspectors every week with a variable list of houses, ranging probably from 50 to 150 at a time, for their visitation and inquiry. The information which I have directed them to seek has referred, of course, to the various details of sanitary condition: to questions of lodgment, ventilation, cleanliness, drainage, water-supply, dust-removal, paving of yards and cellars, existence of nuisances, and the like: and I have constructed tabular forms for their use, which admit of this information being recorded and reviewed in the readiest manner. Week by week, before each meeting of your Court, I have had the habit of going through every particular of these somewhat considerable details. I have sorted out of them those very numerous cases in which your lawful powers could be usefully exerted. When I have deemed it necessary, I have myself made visits of verification or inquiry; and have finally laid

* This information has been mainly derived from two sources:—first, from the weekly Death-Returns of the nine City Registrars, which the Registrar-General most kindly allows me to have transcribed so soon as they arrive at his office;—secondly, from weekly returns which the Medical Officers of the three City Unions have had the great kindness and liberality to supply for my assistance, as to the existence of fever and kindred disorders in the several localities under their charge.—J.S.

before you, in the form which is familiar to your weekly meetings, such recommendations as the week's survey has shown necessary, for enforcing works of local improvement under the powers of your Acts of Parliament. I find that within the last twelve months there have been made 3,147 visitations of this nature, the results of which are recorded in your Office; and, founded on the result of these inspections, there have been issued 983 orders for abatement of causes of disease.

I am very far from considering that these arrangements have been perfect. Circumstances beyond my control have prevented me from constructing as complete an organisation as I could wish; and the fact that your Inspectors are very largely employed in other duties, has perhaps occasionally given some hurry and imperfection to their share of the work. Still, such as it is, this system has been the means of considerable advantage; and I am glad to be able to claim for your Hon. Court the distinction of being first in the metropolis to have established an arrangement for the systematic sanitary visitation of the dwellings of the poor. In relation to this subject, I beg to inform your Hon. Court that your Inspectors have discharged, with much zeal, intelligence, and industry, the duties which you authorised me to impose on them.

During the last few weeks it has become obvious to your Hon. Court that the duties of this department of your service have grown to such dimensions as to necessitate some increase of your staff; and acting on this opinion, mainly with a view to render more complete your sanitary supervision of the City, you have just appointed two additional Inspectors of Nuisances. In making this appointment, you have determined not to restrict any two or three Inspectors exclusively to the business of house-inspection, but to allot the joint duties, sanitary and surveying, equally among their number: parting the area of the City into six, instead of four, Inspectors' districts; so that each Inspector shall give a certain proportion of time to the duties which he has to fulfil under your Surveyor's direction, and another certain proportion to those in which he will be engaged under the direction of

your Officer of Health. It is only some experience of this arrangement that can decide whether it will be the most effectual for your purpose; but in the mean time I have studied so to dispose the industry of your increased staff, under the arrangement you have ordered, as to obtain the most systematic and efficient discharge of those duties which you have desired me to superintend.

Reckoning that each Inspector, if he fulfilled no other duty, could report on the condition of about 50 houses *per diem*, I presume that henceforth, in each of your five more important districts, from 100 to 120 houses can be visited weekly by the Inspector, without encroaching on the time required for his other duties.

The general plan, on which I would propose that this force should be disposed, is the following:—first, as heretofore, the weekly list would contain all places needing investigation on the ground of such deaths and illness as are usually associated with preventable causes, in order that any sanitary defects may at once be remedied in them; secondly, in each week there would fall due a certain number of sanitary works (relating to house-drainage, water-supply, and the like) for which you would have previously issued orders requiring them to be completed within a stated time, and on the satisfactory execution of these it will be the Inspector's duty to examine and certify; thirdly, in each district I would have a certain rota of visitation, according to the badness of the spot and its known liability to fall into filthy and unwholesome condition, requiring one set of houses to be seen weekly, another set fortnightly, another monthly, another quarterly, and so on—a rota, varying from time to time with the changing circumstances of each locality; and, out of this rota, each week would supply a stated number of cases for inquiry, to which I should occasionally add certain of those establishments in which offensive occupations are pursued. Thus, in the large number of weekly visits which I suppose the Inspector to make, there would be a certain proportion of that more elaborate kind which involves an examination of the entire house; another proportion, made for the sole purpose of seeing that previous orders have been executed;

another proportion, repeated at fixed intervals, simply to ascertain that houses, once cleansed and repaired, are not relapsing into filth, nor their works becoming inefficient.

By utilising, on some such plan as this, the increased staff which you have appointed for the purpose, and by giving to its execution my continual superintendence, I trust to be able, from time to time, to certify you that the City becomes better and better capable of resisting epidemic invasion.* From such statements as I have set before you, on the local affinities of disease—not of Cholera alone, but of typhus and its kindred, you will be prepared to expect increased sanitary advantage, from this more systematic suppression of the causes of death: and I believe you will not be disappointed. Whether the anticipated pestilence rage in our metropolis or not, you will be combating, day by day, the influence of other malignant diseases. Whenever it may be in my power to tell you generally of the City, that the dwellings of the poor are no longer crowded and stifling; nor their walls mouldy; nor their yards and cellars unpaved and sodden; nor their water-supply defective; nor their drainage stinking; nor their atmosphere hurt by neighbouring nuisances; then, gentlemen, whether Cholera test your success or not, surely you will have contributed much to conquer more habitual enemies. For whatever there may be specific and exceptional in the production of Cholera, at least it touches no healthy spot: the local conditions which welcome its occasional presence are, in its absence, hour by hour, the workers of other death; and in rendering a locality secure against the one, you will also have made it less vulnerable by the others.

As a last suggestion in this part of my subject, there are two steps which I would recommend to your Hon. Court, as likely to assist the labours of your officers, and to bring a large quantity of important information before you:—first (according to a plan adopted here in the last epidemic) that printed notices should be posted in every back street, court, and alley of the City, and should be renewed once a month,

* I may take this opportunity of mentioning that, during the last few months, the increased sanitary staff has been worked with very great advantage.—J. S., May, 1854.

advising the careful maintenance of cleanliness in all houses, and inviting all persons who are aggrieved by any nuisance, or by any neglect of scavengers and dustmen, or by any defect of water-supply, forthwith to make complaint at your Office, or to the Inspector of the district, whose name and address might be subjoined; secondly, that a circular letter should be written to all persons in parochial authority, also to other clergy, to heads of visiting societies and the like, begging them to communicate with your officers on every occasion when any local uncleanliness or nuisance may come within their knowledge.

3. Finally, gentlemen—in the probable anticipation that next year Cholera will prevail in London with at least its former severity, it may be claimed of my office, that I should say something with respect to personal precautions for avoidance of the disease. While most willing to place at your disposal any useful results of my practical experience in the matter, I cannot but feel the great difficulty of making general suggestions in a form really capable of particular application.

Personal precautions against cholera.

From the eminently local prevalence of the poison, it may be inferred that, for all whose circumstances allow an option in the matter, the first and most important precaution would consist in avoiding those localities where the epidemic is active. Our knowledge of the subject enables us confidently to say that, if in one spot the chance of being attacked by Cholera is as 1 to 100, in another it becomes 1 to 50, in a third 1 to 5, in a fourth almost an equal chance whether to be attacked or not. Nothing is gained towards security by the mere act of leaving our metropolitan area, if one resorts to some other place where the system of drainage is equally vicious, or where—as at our nearest bathing-place, the beach is made almost as offensive by sewage as here the river-banks.* From earlier statements in my Report, it will be

* Unless the sanitary improvement of Brighton be soon set about in earnest, the reputation for healthiness, which established its prosperity, will undergo a very sensible reverse. The natural advantages of the place are now almost neutralised by the evil adverted to in the text, and by other filthinesses of the kind.—J. S., 1854.

obvious to you that the eligible sites of residence are those which stand high and dry, with clean effectual drainage of their soils and houses, conveying all organic refuse beyond range of the local atmosphere.

I will not pass this part of the subject without admitting that the course here suggested might involve a considerable desertion of particuiar localities, and a transient injury to their commerce. This unavoidable result of proclaiming the laws of the disease, I must regret in regard of its personal bearings. But the facts of the case are all-important for the public; and sanitary improvement will perhaps move more quickly in the country, when it is known that the pecuniary prosperity of places may suffer from their reputation for endemic disease.

In case of Cholera prevailing with severity in spots containing a dense poor population, great assistance would be given to medical and sanitary measures, if a number of empty unlet houses, healthily situated, were at the disposal of the authorities; into which, under proper regulations, they might induce certain of the poorest families to migrate for a time, as to places of refuge, till the disease should have subsided about their original dwellings.

For persons, whose circumstances or duties retain them unavoidably in the midst of those suffering districts where the poison is most active, the best counsel I can offer—even if at first hearing it seem vague—is, that they should be vigilant as to preserving the greatest possible soundness and vigour of general health; keeping the body, so far as may be, undisturbed by extremes of heat and cold, undepressed by long confinement, unfluttered by violent passions, unexhausted by physical or mental fatigue, untried by any excess or any privation; taking for diet a sufficiency of fit and nutritive food, rather in generous measure than otherwise, but not exceeding the confines of temperance; and giving meanwhile a prompt attention and cure to whatever accidental ailments may arise.

Such, in general language, are our best fortifications against the poison. It may be well, however, to add that in our metropolitan climate—perhaps everywhere else—the human

frame tends to require some periodical aid from medicine. It may be the excitement and labour of London; it may be its atmosphere; it may be native peculiarity; but thus the fact stands—that there are few persons who do not at intervals require the re-establishing effects of what is called *tonic* treatment. Probably three-fourths of the prescriptions we write are aimed at this mere tendency to depression in the human body, as manifested in one form or another. Now, as a man, going on some distant voyage of exploration, submits his chronometer to a last intelligent scrutiny, before he exposes it to the ordeal of other climates, so, in this matter of frequenting infected districts, men will do prudently, before they pass into perils which may test their powers of resistance, to see that they carry about with them no enfeeblement or disrepair which a short submission to medical discipline could effectually remove. For with epidemic poisons generally, and in a marked degree with Asiatic Cholera, it seems that all states of langour, depression, and debility enhance the risk of infection.*

Beyond these general cautions, there is yet one which requires very particular mention.

In respect of the commencement and predispositions of the disease, it is now well known—first, that in this country it habitually begins with diarrhœa of a painless and apparently trivial character; secondly, that diarrhœa, however produced, is, of all known personal conditions, the one most likely to invite an attack of Cholera at times when that disease is epidemic; thirdly, that during the prevalence of Cholera, side by side with it in a district, there is always a vast amount of epidemic diarrhœa, apparently constituting slighter degrees or earlier stages of the same disease; that this condition is just as amenable to treatment as the confirmed collapse of Cholera is utterly the opposite; and—since we can never say how incurable a few hours may render this insidious symptom,

* For my medical readers, I may suggest that perhaps the daily use of *sulphate of quinine*, in small doses, during the height of the epidemic, would seem to deserve trial as a prophylactic; subject, of course, to what each practitioner is best able to estimate—of personal peculiarity in the patient, forbidding the use of this drug.—J. S., 1854.

that its immediate arrest is a consideration of vital importance.

Precautions against causing diarrhœa to oneself by errors of diet will vary somewhat with different individuals. Every person of ordinary discretion knows the habits of his own body, and can be tolerably confident, within certain limits of food, that he gives himself no occasion of sickness. He remembers articles of diet, which his neighbour perhaps may innocently indulge in, but which to himself are the occasion of inward disorder—of purging or vomiting, "bilious attack" or nettle rash, headache, nightmare, or some other inconvenience. This knowledge fixes the limit which it primarily behoves him to regard; taking such food only into his body as experience has shown best to agree with it; and adhering to this course, without panic as to particular accustomed articles, and without abrupt discontinuance of old harmless habits. Apart from personal peculiarities, the chief dangers of diet appear to lie as follows: first, in those excesses of meat and drink, which (especially under circumstances of fatigue) occasion sickness to the stomach, or an increased labour of digestion; secondly, in taking food, solid or fluid, which is midway in some process of chemical transition—half-fermented beer and wine, water containing organic matters, meat and game and venison no longer fresh and not completely cooked, fish and shellfish, in any state but the most perfect freshness, fruit or vegetables long-gathered or badly kept, and the like; thirdly, in a profusion of cold sour drink; fourthly, in partaking largely of those articles of diet which habitually, or by reason of imperfect cooking, pass unchanged through the intestinal canal; and fifthly, in the indiscreet use of purgative medicines, or in taking any article of diet which is likely to produce the same effect.

In short, if care be taken under all these heads to avoid occasions of intestinal disturbance; if the diet, while generous, be simple and strictly temperate; if regular hours be given to sleep, to meals, to industry, to recreation; if a fair proportion of out-door exercise be taken; if damp and extremes of temperature be guarded against; and all practical pains be given to avoid the sources of bodily and mental depression; the danger

will certainly be reduced to its *minimum*; and whatever effects the epidemic may happen to produce can be readily recognised and boldly encountered.

Should these effects arise in their customary form of diarrhœa, it is of absolute urgent necessity that immediate medical treatment be resorted to: and so important for the safety of life is the recognition of this symptom in the earliest stage of its occurrence, that no unwonted action of the bowels should pass unobserved.

The public constantly asks to be informed of some drug, or combination of drugs, to which under these circumstances they may have immediate recourse. But after very careful consideration of this subject, after hearing arguments on both sides, and reading those prescriptions which have been recommended for adoption, I venture to express my opinion that the safest course for the public, in regard of this threatened disease, will be to follow the same principle as guides them in their ordinary seizures of illness, and to obtain as quickly as possible the aid of their customary medical advisers. There is an invincible aptitude in the public to misapply all precautionary medicines within their reach; often superstitiously to treat them as charms, under the protection of which they may neglect temperance of diet and all other solicitude for health; often ignorantly to employ them in cases for which their use is forbidden; often, at the instigation of panic, to abuse them by preposterous and hurtful excess. Nervous and uneducated persons, instead of employing their astringent dose simply to stop any undue action from the bowels, would be apt, as the danger neared them, to make it an habitual dram in order to anticipate any such action; and the frequent after-necessity for purgative medicine, thus created, would constitute the very danger they desire to avoid. Recognising, therefore, at its full value, the importance of immediately treating, in every case, the first phenomena of epidemic diarrhœa, I must yet doubt whether the conditions of medical science and general education are such as to justify the promulgation of general formulæ so liable to extensive abuse.

I speak of course with particular reference to the metropolis. In remote rural districts it may often be desirable that discreet and intelligent persons—the clergy, for instance, should obtain from their medical neighbours some astringent preparation to which—in the very rare event of real emergency, temporary recourse might be had: but—for so hazardous a condition of disease, I must repeat as a general rule, that no nostrum, even in the best-intentioned hands of ignorance, can supply the place of medical discrimination.

During the acute prevalence of the epidemic in any particular locality, it becomes of great importance to bring the uneducated classes of society, as far as possible, under systematic medical care; in the absence of which they are likely to neglect all premonitions of the disease, and thus to incur much unnecessary danger. To fulfil this object as regards the poor, express provision has been made by the law: and it might be well for other classes, under similar exposure to attack, to consider how far they could arrange for their households a similar plan of protection.

Under any Order in Council which brings into action the extraordinary powers of the Nuisances Removal Act, the General Board of Health has authority to enjoin on all Boards of Guardians throughout the country, that they provide for "persons afflicted by or threatened with" the disease, such medical aid as may be required: and the actual working of this has been that, on all occasions of epidemic Cholera prevailing in particular localities, the General Board of Health has called on the local Boards of Guardians to establish systematic house-to-house visitation, for discovering and treating among the poor all premonitory symptoms of the disease.

In the too probable event of its becoming necessary next year to establish this system of medical organisation in parts of the metropolis, I have no reason to doubt that a requisition to the above effect will be addressed to the Guardians of the City poor; and, in this anticipation, I think it desirable to bring, in conclusion, one more point under notice of your Hon. Court. During the former invasion, the Guardians within

the City of London resisted the requisitions of the General Board of Health; and the first fourteen weeks of the epidemic consequently passed without the establishment of any visitational system for arresting its progress. In the fifteenth week, however, the Corporation of the City undertook the unperformed duty, not legally devolving on them, and requested me to make arrangements for the purpose of its execution. With the assistance of the several Medical Officers of the City Unions, I immediately organised the requisite staff, and from that moment to the close of the epidemic there continued under my superintendence a systematic visitation of the poor, with beneficial, though tardy and imperfect, results.

Recalling these incidents to the recollection of your Hon. Court, I would beg to observe that no similar endeavour can fully succeed, except as a system—well considered beforehand, and adjusted to the various circumstances which may require its application. Uncertainties of responsibility and conflicts of jurisdiction would inevitably occasion a sacrifice of life; and therefore, before the time when Cholera is likely to become epidemic, it should be definitely settled who is to undertake this organisation. Your Commission can have no jurisdiction in the matter; and the interference of the Corporation would be only at its own option. The legal responsibility rests solely with the Boards of Guardians: and it seems to me indispensable that, before the time for action arrives, the Corporation should determine its intentions; in order that the Boards of Guardians, if again called upon to organise arrangements of the kind in question, may know distinctly—either that the Corporation has relieved them of their task, or that there rests on them the undivided obligation of providing for the crisis.

From Special Report, dated December 19th, 1854.

[It may be here noted that about this period it was beginning to be recognized that the prevalence of Cholera in this country depended not only upon foul conditions of air or water, but also upon a "migratory agent," capable of operating only when the air and water were foul. In the Report of the Scientific Inquiries Committee of the General Board of Health to Sir Benjamin Hall, the President, in the same year, parts of which are evidently from the pen of Mr. Simon, this view respecting the essential causes of Cholera also finds expression. About this period of the third visitation of Asiatic Cholera it was beginning to be recognized that the General Board of Health had gone wrong in its extreme anti-contagionism.—ED.]

It has been my principal aim in this Report briefly to set before you the coincidence of two facts:—*first*, that you have suffered from Cholera below your former mortality in the proportion of 211 to 728, below the metropolitan mortality in the proportion of 16 to 45, and even below the lighter mortality on the north side of the Thames (from Hampstead to the river) in the proportion of 16 to 26:—*secondly*, that, for many months before the outbreak of Cholera, there had been extensively prosecuted through the entire City such attainable sanitary measures as you deemed the best protection against disease.

Want of knowledge respecting causes of cholera.

Beyond this collation of facts it is hitherto most difficult to argue. The laws of epidemic visitations are very imperfectly known to us. Partly we have learnt the conditions which augment their local spoil; but nothing of what evokes their slumbering power, nothing of what governs their world-wide spread, nothing of what determines their eventual decline, nothing of what permits their fitful mildness. In this domain of unknown, perhaps unconjectured, influences, science would count it irreverence and temerity to dogmatise on single instances of apparent correlation, or to speak of the obscure impulses of that wandering plague, as though they were the strokes of some machine subject to the guidance of one's human will.

Cholera is called a capricious disease, not for what it smites, but for what it spares: not because its ravages fall where the laws of Nature are observed; but because many

neglects escape unscourged, or are punished rather in sample than in totality.

When the history of the recent epidemic is compiled, it may record many startling incidents which only riper knowledge can explain. It may show that considerable populations, despite great filthiness, have suffered little retribution. It may set beside the illustration of your present immunity the unintelligible parallel of some equal freedom from disease, which no precaution had been taken to ensure.

Filthy districts often escape the disease for long.

Yet not for these fractional exceptions (whatever scientific caution they may teach) can we hesitate as to the main affinities of the disease, or question that every such cloud of apparent contradiction will vanish before the stronger sight of more advanced experience.

It requires little education in the great harmonies of Nature, to feel that in her empire there is no place for accident or caprice; that in the streams and eddies—the ebb and flow—of epidemic invasion, chance can no more prevail than in the planetary movements or the tides; and that whatever to our scanty knowledge seems exceptional or contradictory, must really mark some longer cadence in the rhythm of an invariable law.

If the large induction be right (and I know of none which rests on firmer basis) that, for the permanent avoidance of epidemic disease, cleanliness is the sole safeguard; we may look with painful certainty to the ultimate vindication of this law, wherever, during the late pestilence, apparent exceptions have prevailed. A more continuous pressure or greater virulence of other zymotic diseases may be the appointed equivalent for those seemingly anomalous escapes; or (as the neighbourhood of Berwick Street has lately felt) long arrears of impunity may—we know not when—be cancelled in one dreadful blow, that wakes the unguarded district, as with some bursting storm, and leaves half its population mourners.

But arrears of impunity may be cancelled in one dreadful blow.

We must wait for scientific insight, the fruit of larger observation, to adjudicate on such cases and on your own. Ample pains as you have taken to deserve that Cholera

should spare your population, and richly as your hopes are realised, there can be given no present demonstration that this happy result had been the unconditional effect of your sanitary labours.

Better health, a sequel of greater cleanliness.

But, though the laws which allow the mitigation of epidemic pestilence be too crudely known for anyone with precision to decide between the successful avoidance and the fortunate escape of such disease, we may gladly feel that in our case there is no semblance of exception or anomaly. That we have enjoyed better health in sequel of greater cleanliness, is an incident which accords with all coherent experience of the subject, and represents the illustration of a general law. Links of cause and effect may, in the particular instance, lie beyond our means of demonstration: but we know, as universal truth, that similar results are the promise of similar exertions; and, confident in this practical knowledge, we may waive the impossible proof, to accept the suggestive lesson.

Yet, although I can give you no logical certainty that you have saved even a single life, it would argue some credulity to believe that the facts I have mentioned were in mere casual coincidence:—not only because the safety of one square mile of area, with 130,000 crowded inhabitants, unfavourably placed in the midst of an infected metropolis, would furnish a strange and unlikely exception to the spread of an epidemic ferment; but because, knowing, on the testimony of your 200 deaths, that this influence has moved and operated through the City, you can hardly do otherwise than refer your comparative exemption to a comparative absence of those local conditions which that foreign ferment has the faculty of kindling into powers of epidemic destruction.

And if indeed it be true, as I believe, that through your timely precaution many human lives have been saved and much human suffering averted, this illustration of a great principle could have come at no more appropriate moment than now. Never could philanthropy more ardently have wished—never could the exigencies of a time have more imperatively claimed, that the promises of sanitary medicine should largely fulfil themselves.

The whole heart of our country turns to distant scenes, where its noblest blood is being shed like rain, and where the triumphs of unspeakable gallantry and fortitude are purchased, day by day, at the bitter cost of national bereavement.

It will be something of comfort amid those heaviest thoughts, if we may believe that the peaceful arts maintain their progress for good; that an improved interpretation of Nature is strengthening the resources of civilisation; that the unarmed hand of Science, helpless in those terrible conflicts, may partly countervail their cruel wrong, and redress the troubled balance of human interests; staying the sources of physical degeneration, lessening the death-roll of wasted manhood, and sparing some tears of widowhood and orphanage.

APPEALS TO COMMISSIONERS AS SANITARY AUTHORITY.

From First Annual Report.

[These extracts from the Reports of the first Medical Officer of Health in London will have a special interest to those who serve local governing bodies in a similar capacity.—Ed.]

Here, gentlemen, terminates the list of subjects which, on this occasion, I have thought it my duty to bring before you. Long as the enumeration may have appeared, I can assure you that my present Report bears a small proportion, in point of dimensions, to the very large and very various mass of materials on which it is founded. In compressing it within the narrowest limits consistent with intelligibility, and in excluding from it nearly all details on the matters treated of, I have consulted the convenience of your Hon. Court, notwithstanding the greater labour and difficulty of execution which belong to the plan I have adopted. At any time, in Court or in Committee, when you may wish to pursue the subject, I shall be ready to enter at far greater length, and with more elaborate minuteness, on any of those subjects which, at the present opportunity, I have only sketched for your general information.

Appeals to the sanitary authority.

In the matters which I have enumerated, some lie distinctly within your province, as assigned by the Act of Parliament; while others may be thought to lie, just as distinctly, without that province. In affairs strictly under your jurisdiction, and within the present scope of the law, there remains very much to achieve. The complete enforcement of house-drainage, till every house washes itself into the sewer; the more general distribution of water, till every individual within the City has an abundant supply within his immediate reach; the effective preservation of public cleanliness; the construction and maintenance of sewerage, paving, lighting, for all the streets, courts, and passages of this great City;—these constitute an immense amount of responsibility and labour. Those other objects to which I have referred, are partly such as cannot be accomplished without the further interference of the Legislature. It is a point solely for the discretion of your Hon. Court to determine, how far you may be willing to enlarge the sphere of your sanitary operations, and to undertake the difficulties of a new campaign.

To your Officer of Health the Act of Parliament allows no such option,. "Whereas the health of the population, especially of the poorer classes, is frequently injured by the prevalence of epidemical and other disorders," therefore it is appointed for his duty that he shall report on whatsoever "injuriously affects the health of the inhabitants of the City," and that he shall "point out the most efficacious mode of checking or preventing the spread of contagious or other epidemic disease." Actuated by obligation of the duty thus expressed in your Act of Parliament, after full reflection on all that those expressions imply, and with the deepest sense of the responsibility belonging to one who is honoured with the task of advising the first Corporation of the country in respect of its sanitary proceedings, I have been compelled, in the course of my present Report, to trench upon many subjects which do not customarily fall under your consideration, and which (as I have stated) may by some be considered as utterly foreign to your jurisdiction and province.

It rests with your Hon. Court to determine what course you will adopt in respect of such departments of the great sanitary scheme;—whether you will retain them under your consideration, and will assume the responsibility of dealing with them in proportion to their magnitude and importance, or will transfer them to the Court of Common Council for the less restricted deliberation of that body.

Let me once more declare my profound conviction of their importance to the health and welfare of the City.

To provide an inoffensive outfall for the sewerage of our vast population; to render the river a source of unqualified advantage; to give wide extension and sounder principles to the system of water-supply; to suppress all trades and occupations which taint the atmosphere with materials of organic decomposition; to abate the nuisance of smoke; to provide the facilities for extramural interment, and to procure the prohibition of all further burial amidst our living; to improve the domestic arrangements of the poor, and to insure for them an adequate supervision; to establish public baths and laundries, which may offer the utmost facilities and inducement for the maintenance of personal cleanliness; to hinder the occupation of houses which breed pestilence; to destroy such as are irremediably hostile to health, and to disperse the stifled population of courts and alleys; to substitute for such slums as we hope to depopulate and destroy, but in open streets and with perfect ventilation, houses and lodgings, which not only shall offer to the labouring classes every convenience essential to health and decency and comfort, but shall likewise serve as models of household economy for the whole district in which they stand;—these, gentlemen, are the aims, briefly recapitulated, for the sake of which I have been obliged, as it were casually in my Report, to touch on many subjects perhaps foreign to your jurisdiction, but lying at least on the confines of your province, and remaining with you now either to retain or to transfer.*

* Perhaps, to make these passages intelligible, the reader should be apprised that the business of the Corporation is considered in a great variety of Committees, which thus have their several and particular provinces. Of the many matters adverted to, as foreign to the ordinary functions of the Commission of Sewers, some might belong to the *City-Lands* Committee, some to the *Improve-*

That the subject of sanitary improvement in its widest scope, and with all that even incidentally relates to it, is one which, according to the ancient constitution of the City, rightfully belongs to the authorities of the Corporation, in some one or other of their municipal relations—that it belongs to them equally as their privilege and their duty, cannot for a moment be questioned. And if your Hon. Court should determine on a negative opinion as regards yourselves, and should decide on transferring these matters to the Common Council, I venture to hope that your influence may accompany them in their course, and may procure for them the consideration they deserve.

Gentlemen, the history of the City of London is full of great examples of public service. It records many a generous struggle for the Country and for the Constitution; it records a noble patronage of arts and letters; it records imperial magnificence and Christian liberality; but never, within the scope of its annals, has the Corporation had so grand an opportunity as now for the achievement of an unlimited good. Because of the City's illustrious history, and because of the vast wealth and power which have enabled it so often to undertake the largest measures of public utility and patriotism, —therefore it is, that the expectations of the country may well be fixed on the City of London in regard of this, the distinguishing movement of modern times—the movement to improve the social condition, and to prolong the lives of the poor.

Those who are familiar with the many abiding monuments of your civic munificence and splendor, may well expect that, in approaching this all-important question, the counsels of the City will be swayed by high and generous considerations.

In the great objects which sanitary science proposes to itself,—in the immense amelioration which it proffers to the physical, to the social, and indirectly to the moral condition of an immense majority of our fellow-creatures, it transcends the

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ment, some to the *Finance*, some to the *Navigation*, some to the *Markets* Committee, and so on. Obviously it would have been out of my place to touch on these details of jurisdiction; and I therefore urged only the essentially *municipal* character of the several improvements I advocated.—J. S., 1854.

importance of all other sciences, and in its beneficent operation seems most nearly to embody the spirit and to fulfil the intentions of practical Christianity.

Ignorant men may sneer at its pretensions; weak and timorous men may hesitate to commit themselves to its principles, so large in their application; selfish men may shrink from the labour of change, which its recognition must entail; wicked men may turn indifferently from considering that which concerns the health and happiness of millions of their fellow-creatures. To such men an appeal would indeed be useless. But, to the Corporation of the City of London—whether as assembled in its entire Parliament, or as represented within the confines of this Court—to the Corporation which, on so many occasions, has attained patriotic ends by great expenditure and sacrifice; to men earnest, strong-minded, and practical, having much consideration for their fellow-creatures, and having little consideration for personal toil or municipal expense, so only that they may fulfil a great Christian duty, and may confirm the gratitude with which history records their frequent services to our kind;—to such a Corporation, and to such men, the Country looks for the perfection of a sanitary scheme which shall serve as model and example to other municipal bodies undertaking the same responsibility; and to such a Corporation and to such men do I, likewise, your Officer of Health, respectfully and confidently address a well-founded appeal.

From Fifth Annual Report.

Gentlemen, in concluding this Report, I will not attempt to disguise from you that it has been written under feelings of considerable apprehension; and I am fully conscious that, in thus expressing myself, I am liable to the imputation of raising unnecessary alarm.

If the possible mischief to be wrought by epidemic Cholera lay in some fixed inflexible fate, whatever opinion or knowledge I might hold on the subject of its return, silence would be better than speech; and I could gladly refrain from vexing the public ear by gloomy forebodings of an inevitable future.

But from this supposition the case differs diametrically: and the people of England are not like timid cattle, capable, only when blindfold, of confronting danger. It belongs to their race—it belongs to their dignity of manhood, to take deliberate cognisance of their foes, and not lightly to cede the victory. A people that has fought the greatest battles—not of arms alone, but of genius and skilful toil, is little likely to be scared at the necessity of meeting large danger by appropriate devices of science. A people that has inaugurated railways—that has spanned the Menai Strait and reared the Crystal Palace, can hardly fear the enterprise of draining poison from its infected towns. A people that has freed its foreign slaves at twenty millions' ransom, will never let its home population perish, for cheapness sake, in the ignominious ferment of their filth.

Therefore, gentlemen, advisedly I state the danger as it seems to me. England has again become subject to a plague, the recurrence of which—or the duration—or the malignity, no human being can predict.

But if I state the danger, so likewise, to the best of my belief, I state the remedy and defence. Colossal statistics concur with the results of detailed inspection to refer this disease, in common with many others that scourge our population, distinctly and infallibly, to the working of local causes —of causes susceptible of removal—of causes which it devolves on our Legislature to remove.

The exemption we seek is worth a heavy purchase. My thoughts turn involuntarily to the epidemics of former centuries, to their frequent returns and immense fatality. I reflect on the Plague, and how it influenced the average death-rate of London; how in 1593 it doubled it, in 1603 trebled it, in 1625 quadrupled it: and how (after a less considerable visitation in 1636) it actually multiplied the mortality seven-fold in the tremendous epidemic of '65. The ravages of that pestilence are best appreciated in the fact that we esteem the Great Fire of London a cheap equivalent for their arrest; looking to that eventful conflagration of the metropolis with gratitude rather than horror, because of the mightier evils that were extinguished with its flames.

To so frightful a development as this, Cholera, by many degrees, has not attained; but, ignorant as we are of its laws and resources, we dare not surmise, at any renewed invasion, what increment of severity it may have won. In the simple fact, that our country has again become subject to pestilential epidemics, there lies an amount of threat only to be measured by those who are conversant, by history or experience, with the possible developments of such disease.

Therefore, gentlemen, having the deepest assurance that these unexplored possibilities of evil may be foreclosed by appropriate means, I should ill deserve your confidence if I shrank from setting before you—however ungracious the task—my deliberate estimate of the peril.

It pertains to my local office to tell you of local cures; and this I have sought to do. I have suggested that, by active superintendence of all houses within your jurisdiction, there may be suppressed in detail those several causes of the disease which arise in individual neglect; that, by elaborate care as to the cleanliness of pavements, markets, docks, and sewers, something may be done towards the mitigation of more general causes; that by a well-organised system of medical visitation very much may be effected towards encountering attacks of the disease while still amenable to treatment:—that these, with similar precautions, are therefore to be recommended.

And not for a moment would I seem to depreciate such measures, palliative only, and partial though they be. By their judicious application, from Aldgate to the Temple, life may possible be saved to some hundreds; to children that are fondly loved, to parents that are the stay of numbers.

But against the full significance of any epidemic I am bound to tell you that these are but poor substitutes for protection. To render them effectual, even in their narrow sphere of operation, there must be great vigilance and great expenditure; a weary vigilance and a disproportionate expenditure, because chiefly given to defeat in detail what should have been prevented in principle. And be done what may, in this palliative spirit, the sources of the disease are substantially unstayed: for the faults to which its metro-

politan prevalence is due consists not simply in a number of individual mismanagements, but include a common and radical mal-construction as their chief.

No city, so far as science may be trusted, can deserve immunity from epidemic disease except by making absolute cleanliness the first law of its existence; such cleanliness, I mean, as consists in the perfect adaptation of drainage, water-supply, scavenage, and ventilation to the purposes they should respectively fulfil; such cleanliness as consists in carrying away by these means, inoffensively, all refuse materials of life—gaseous, solid, or fluid, from the person, the house, the factory, or the thoroughfare so soon as possible after their formation, and with as near an approach, as their several natures allow, to one continuous current of removal.

To realise for London this conception of how a city should cleanse itself may involve, no doubt, the perfection of numberless details. Yet, most of all, it would pre-suppose a comprehensive organisation of plan and method; not alone for that intramural unity of system which is needful for all the works, as most for those of drainage and water-supply; but equally to harmonise these works with other extramural arrangements for utilising to the country the boundless wealth of metropolitan refuse—for distributing to the uses of agriculture what is then rescued from the character of filth—for requiting to the fields in gifts for vegetation what they have rendered to the town in food for man.

How far the construction of London has proceeded on the recognition of such objects, or how far the advantages of such a plan have been realised, it could only be a mockery to ask. Our metropolis, by successive accretions, has covered mile after mile of land. Each new addition has been made with scarcely more reference to the legitimate necessities of life than if it had clustered there by crystallisation. With no scientific forecast to plan the whole, with little but chance and cheapness to shape the parts, our desultory architecture has eclipsed the conditions of health. Draining up-hill or down-hill, as the case might be, and running their aqueducts at random from chalk quarries or river mud; or ponding

sewage in their cellars, and digging beside it for water; blocking-up the inlets of freshness and, equally, the outlets of nuisance; constructing sewers to struggle with the Thames—now to pollute its ebb, now to be obstructed by its flow; the builders of many generations have accumulated sanitary errors in so intricate a system that their apprehension and their cure seem equally remote.

Therefore—by reason of causes, ramified through the whole metropolis and deep-rooted in its soil, which bind all parts together in one common endurance of their effects—therefore cannot epidemic disease be conquered by any exertions or by any amelioration short of the complete and comprehensive cure. Against the danger we dread no shelter is to be found in petty reforms and patchwork legislation. Not to inspectorships of nuisances, but to the large mind of State-Policy, one must look for a real emancipation from this threatening plague.

A child's intellect can appreciate the wild absurdity of seeking at Peru what here runs to waste beneath our pavements,—of ripening only epidemic disease with what might augment the food of the people—of waiting, like our ancestors, to expiate the neglected divinity of water in some bitter purgation by fire.

But it needs the grasp of political mastership, not uninformed by science, to convert to practical application these obvious elements of knowledge; to recognise a national object irrelevant to the interests of party; to lift an universal requirement from the sphere of professional jealousies, and to found in immutable principles the sanitary legislation of a people.

A MINISTRY OF HEALTH.

From the preface to the volume of the reprinted City Reports, dated May 15th, 1854.

A ministry of health.

This national prevalence of sanitary neglect is a very grievous fact; and though I pretend to no official concern in anything beyond the City boundaries, I cannot forego the

present opportunity of saying a few words to bespeak for it the reader's attention. I would beg any educated person to consider what are the conditions in which alone animal life can thrive; to learn, by personal inspection, how far these conditions are realised for the masses of our population; and to form for himself a conscientious judgment as to the need for great, if even almost revolutionary, reforms. Let any such person devote an hour to visiting some very poor neighbourhood in the metropolis, or in almost any of our large towns. Let him breathe its air, taste its water, eat its bread. Let him think of human life struggling there for years. Let him fancy what it would be to himself to live there, in that beastly degradation of stink, fed with such bread, drinking such water. Let him enter some house there at hazard, and —heeding where he treads, follow the guidance of his outraged nose, to the yard (if there be one) or the cellar. Let him talk to the inmates: let him hear what is thought of the bone-boiler next door, or the slaughter-house behind; what of the sewer-grating before the door; what of the Irish basket-makers upstairs—twelve in a room, who came in after the hopping, and got fever; what of the artisan's dead body, stretched on his widow's one bed, beside her living children.

Let him, if he have a heart for the duties of manhood and patriotism, gravely reflect whether such sickening evils, as an hour's inquiry will have shown him, ought to be the habit of our labouring population: whether the Legislature, which his voice helps to constitute, is doing all that might be done to palliate these wrongs; whether it be not a jarring discord in the civilisation we boast—a worse than pagan savageness in the Christianity we profess, that such things continue, in the midst of us, scandalously neglected; and that the interests of human life, except against wilful violence, are almost uncared for by the law.

And let not the inquirer too easily admit what will be urged by less earnest persons as their pretext for inaction—that such evils are inalienable from poverty. Let him, in visiting these homes of our labouring population, inquire into the actual rent paid for them—dog-holes as they are; and studying the financial experience of model dormitories and

model lodgings, let him reckon what that rent can purchase. He will soon have misgivings as to dirt being cheap in the market, and cleanliness unattainably expensive.

Yet what if it be so? Shift the title of the grievance—is the fact less insufferable? If there be citizens so destitute, that they can afford to live only where they must straightway die—renting the twentieth straw-heap in some lightless fever-bin, or squatting amid rotten soakage, or breathing from the cesspool and the sewer; so destitute that they can buy no water—that milk and bread must be impoverished to meet their means of purchase—that the drugs sold them for sickness must be rubbish or poison; surely no civilised community dare avert itself from the care of this abject orphanage. And —*ruat cœlum*, let the principle be followed whithersoever it may lead, that Christian society leaves none of its children helpless. If such and such conditions of food or dwelling are absolutely inconsistent with healthy life, what more final test of pauperism can there be, or what clearer right to public succour, than that the subject's pecuniary means fall short of providing him other conditions than those? It may be that competition has screwed down the rate of wages below what will purchase indispensable food and wholesome lodgment. Of this, as fact, I am no judge; but to its meaning, if fact, I can speak. All labour below that mark is masked pauperism. Whatever the employer saves is gained at the public expense. When, under such circumstances, the labourer or his wife or child spends an occasional month or two in the hospital, that some fever infection may work itself out, or that the impending loss of an eye or a limb may be averted by animal* food; or when he gets various aid from his Board of Guardians, in all sorts of preventable illness, and eventually for the expenses of interment, it is the public that, too late for the man's health or independence, pays the arrears of wage which should have hindered this suffering and sorrow.

* Twenty years' daily experience of hospital surgery enables me to say, from personal knowledge, that our wards and out-patient rooms are never free from painful illustrations of the effects of insufficient nutrition—cases, in fact, of chronic starvation-disease among the poor; such disease as Magendie imitated, in his celebrated experiments, by feeding animals on an exclusively non-azotised diet.—J. S.

Probably on no point of political economy is there more general concurrence of opinion, than against any legislative interference with the price of labour. But I would venture to submit, for the consideration of abler judges than myself, that before wages can safely be left to find their own level in the struggles of an unrestricted competition, the law should be rendered absolute and available in safeguards for the ignorant poor—first, against those deteriorations of staple food which enable the retailer to disguise starvation to his customers by apparent cheapenings of bulk; secondly, against those conditions of lodgment which are inconsistent with decency and health.

But if I have addressed myself to this objection, partly because—to the very limited extent in which it starts from a true premiss, it deserves reply; and partly because I wish emphatically to declare my conviction, that such evils as I denounce are not the more to be tolerated from their rising in unwilling Pauperism, rather than in willing Filth; yet I doubt whether poverty be so important an element in the case as some people imagine. And although I have referred especially to a poor neighbourhood—because here it is that knowledge and personal refinement will have least power to compensate for the insufficiencies of public law; yet I have no hesitation in saying that sanitary mismanagement spreads very appreciable evils high in the middle ranks of society; and from some of the consequences, so far as I am aware, no station can call itself exempt.

The fact is, as I have said, that, except against wilful violence, life is practically very little cared for by the law. Fragments of legislation there are, indeed, in all directions: enough to establish precedents—enough to testify some half-conscious possession of a principle; but for usefulness, little beyond this. The statutes tell that now and then, there has reached to high places the wail of physical suffering. They tell that our law-makers, to the tether of a very scanty knowledge, have, not unwillingly, moved to the redress of some clamorous wrong. But—tested by any scientific standard of what should be the completeness of sanitary legislation; or tested by any personal endeavour to procure the legal

correction of gross and glaring evils; their insufficiencies, I do not hesitate to say, constitute a national scandal, and, perhaps in respect of their consequences, something not far removed from a national sin.

In respect of *houses*—here and there, under local Acts of Parliament, exist sanitary powers, generally of a most defective kind; pretending often to enforce amendments of drainage and water-supply; sometimes to provide for the cleansing of filthy and unwholesome tenements; in a few cases to prevent over-crowding: very rarely to ensure stringent measures against houses certified to be unfit for human habitation. Occasionally—but a few lines would exhaust the list, an application of the Public Health Act, or some really efficient local Act, has put it within reach of the authorities to do all that is needful under certain of these heads. But I know of no such town that would bear strict examination as to its possession of legal powers to fulfil, what I presume must be the principle contemplated by the law—that no house should be let for hire unless presenting the conditions indispensable for health, or be hired for more occupants than it can decently and wholesomely accommodate.* However this may be

* In addition to the ordinary powers—given, for instance, in the Public Health or City Sewers Act, for abating accumulated nuisances and for enforcing wholesome constructional arrangements; a principal requirement of all bodies having jurisdiction for the public health is, that there should be vested in them some authority, *enabling them to regulate,* in the spirit of the Common Lodging House Act, *all houses which are liable to be thronged by a dangerous excess of low population.* Almost invariably such houses are of the class technically known as "tenement houses," *i.e.*, houses divided into several tenements or holdings; whereof each—though very often consisting but of a single small room, receives its inmates without any available restriction as to their sex or number, and without regard to the accommodation requisite for cleanliness, decency, and health. The inhabitants of such houses, especially where of the lower order of Irish, constantly lapse into the most brutal filthiness of habits, and live in almost incredible conditions of dirt, over-crowding, and disease. Powers for dealing with these evils might be given to Local Boards of Health, most usefully, I think, in some such form as the following: 1) That—in respect of any house occupied by more than one family, if it be situate in any court, alley, or other place having no carriage-way, and be not assessed to the poor-rate at a higher rental than £ . . . . *per annum;* or if in it any occupied holding consist of only one room, provided the rent of such room do not exceed the sum of . . . . . shillings per week; or if in it there reside, or within three months previous have resided, any person receiving parochial relief, medically or otherwise; on the certificate of a duly authorised medical officer, that any such house,

expressed, and in whatever laws embodied, local or general, I will venture to say that no Government should suffer a town, either to be without the means of enforcing this principle, or, having such means, to shirk their exercise. Our Constitution may properly concede that local representative authorities shall have their option whether, for sanitary purposes, to fall under a general law, or to have Local Improvement Acts of their own; but, in the present state of knowledge, it certainly seems incontestable that one or other of these alternatives should be compulsory, and that all Local Improvement Acts should be required, in their sanitary clauses, to come up to the standard of the Public Health Act of the time, whatever it may be.

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or part thereof, is habitually in a filthy condition, or that from over-crowding or defective ventilation the health of its inmates is endangered, or that there has prevailed in it undue sickness or mortality of an epidemic or infectious kind; the Local Board may call upon its owner to register it in a book kept for this purpose; and in respect of all houses thus registered, the Local Board may make rules for periodical washing, cleansing, and limewhiting, and for the regular removal of all dust or refuse matter, may fix the number of tenements into which it shall be lawful to divide any such house, or the total number of inmates who may at one time be received therein, may require its better ventilation by the construction of additional windows or louvres, and may from time to time make such other regulations and orders as they shall judge necessary for the maintenance of health and decency; and may recover from the owner or lessee of any such house penalties for neglect of any legal requisitions, rules, and orders, as aforesaid: 2) that—on the certificate of a duly authorised medical officer, that the condition of any house or room is such as to render probable the rise or the spread of infectious and dangerous disease among its inmates, the Local Board may cause the owner or lessee of such house to be summoned before a magistrate; who, after due hearing, or in default of the owner's or lessee's appearance, may order the house, or any part of it, to be evacuated of all tenants within such time as he shall judge fit, and not again to be tenanted till after licence from the Local Board given on the certificate of their medical officer that its causes of unhealthiness are abated; and the magistrate may enforce penalties for non-compliance with his order, as aforesaid: 3) that—after an Order in Council bringing into action the extraordinary clauses of the Nuisances Removal Act, the Local Board, on receiving the certificate of their medical officer that any house, or part of house, is in such condition as to be imminently dangerous to the lives of its inmates in respect of the prevailing epidemic, or any similar disease, may issue a peremptory order for its evacuation, and may recover, from the owner or lessee to whom such order is addressed, penalties for every day during which, or part of which, after such order, the house, or any part thereof, continues to be tenanted; nor, under like penalties, shall it be lawful, except after written licence from the Local Board, given as aforesaid, to allow such house to be re-occupied.—J. S.

Under circumstances like those just adverted to, may be found traces of enactment against *offensive and injurious trades.* Unregulated slaughtering throughout all London, except the City, tallow-melting in St. Paul's Church-yard, bone-boiling beside Lambeth Palace, may serve to illustrate the completeness and efficiency of these laws—even in our metropolitan area. Here we greatly lack some competent authority, on the part of the Government, to investigate all circumstances connected with such establishments, generally; to suggest laws for their prospective restriction, as to places wherein they may lawfully settle; and to frame regulations —enforceable by any Local Board of Health, for ensuring that all available measures be employed to mitigate their nuisance. Considering the circumstances under which many of these establishments have existed, no one can entertain a thought, that—even for the public health, they should be liable to the tyranny of an unconditional displacement. But if there existed—as undoubtedly there should exist, some skilled tribunal, competent to speak on the subject; then, I will venture to say, it might be quite in accordance with our English sense of liberty, that—after a certain condemnatory verdict by this tribunal, it should be open to the Local Board of Health to procure their expulsion, on payment of whatever compensation an ordinary jury might award.

Again, with *factories;* thanks to Lord Shaftesbury's indefatigable benevolence, the law has appointed an inspection of certain establishments, a restriction of their hours of labour, and some care against the dangers of unboxed machinery. And with mining also the law has interfered, chiefly as to the ventilation of mines; but hitherto so ineffectively that, while I write, the coal-miners are remonstrating with the Legislature on the thousand lives *per annum* still sacrificed through the insufficient protection accorded them. If there be meaning in this legislation—if it imply any principle, the meaning and the principle require to be developed into a general law, that every establishment employing labour be liable to inspection and regulation in regard of whatever acts and conditions are detrimental or hazardous to life. If factory-children are cared for, lest they be overworked; and miners,

lest they be stifled; so, for those who labour with copper, mercury, arsenic, and lead, let us care, lest they be poisoned! for grinders, lest their lungs be fretted into consumption! for match-makers, lest their jaws be rotted from them by phosphorus! And here let it again be noticed, as in the class of cases last spoken of, how greatly wanted is some skilled tribunal, to form part of any lawful machinery which might ensure that, in these and similar instances, no precautions necessary to life are withheld through ignorance or parsimony.

Against *adulterations of food*, here and there, obsolete powers exist, for our ancestors had an eye to these things; but, practically, they are of no avail. If we, who are educated, habitually submit to have copper in our preserves, red-lead in our cayenne, alum in our bread, pigments in our tea, and ineffable nastiness in our fish-sauce, what can we expect of the poor? Can they use* galactometers? Can they test their pickles with ammonia? Can they discover the tricks by which bread is made dropsical,† or otherwise deteriorated in value, even faster than they can cheapen it in price? Without entering on details of what might be the best organisation against such things, I may certainly assume it as greatly a *desideratum*, that local authorities should uniformly have power to deal with these frauds (as, of course, with every sale of decayed and corrupted food) and that they should be enabled to employ skilled officers, for detecting at least every adulteration of bread and every poisonous admixture in condiments and the like.

In some respects this sort of protection is even more necessary, as well as more deficient in regard to *the falsification of drugs*. The College of Physicians and the

* The proverbial dilutions of milk are not its only deteriorations. Cows are so ill kept in London, and in consequence so often sickly, that milk suffers—sometimes by mere impoverishment, sometimes by much graver derangements. If there were instituted a proper Inspection of Provisions, one function of its officers should be to visit cow-houses, and to prevent the distribution of milk thus damaged or infected. I suspect that a sanitary reform of these establishments would make a sensible difference to the nursery-population of the metropolis.—J. S.

† A chief artifice in the cheapening of bread is to increase its weight by various means which render it retentive of water. The other usual frauds consist in the employment of inferior flours—either not cereal, or damaged and partially deglutinised.—J. S.

Apothecaries' Company are supposed to exercise supervision in the matter; so that at least its necessity is recognised by the law. The security thus afforded is, in practice, null. It is notorious in my profession that there are not many simple drugs, and still fewer compound preparations, on the standard strength of which we can reckon. It is notorious that some important medicines are so often falsified in the market, and others so often mis-made in the laboratory, that we are robbed of all certainty in their employment. Iodide of potassium—an invaluable specific, may be shammed to half its weight with the carbonate of potash. Scammony, one of our best purgatives, is rare without chalk or starch, weakening it, perhaps, to half the intention of the giver. Cod-liver oil may have come from seals or from olives. The two or three drops of prussic acid that we would give for a dose may be nearly twice as strong at one chemist's as at another's. The quantity of laudanum equivalent to a grain of opium being, theoretically, 19 minims; we may practically find this grain, it is said, in 4·5 minims, or in 34·5. And my colleague, Dr. R. D. Thompson, who has much experience in these matters, tells me that of calamine—not indeed an important agent, but still an article of our pharmacopœia—purporting daily to be sold at every druggist's shop, there has not for years, he believes, existed a specimen in the market.*

Again, with the *promiscuous sale of poisons*, what incredible laxity of government! One poison, indeed, has its one law. Arsenic may not be sold otherwise than coloured,

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* Dr. Thompson tells me that he has known white precipitate of mercury sold in hundred-weights as calomel, and in one case (he believes by accident or ignorance) as trisnitrate of bismuth. In my text I have endeavoured to adduce such illustrations as I suppose to be most notorious; but I may refer the reader to various interesting papers published, through the last two or three years, in the LANCET (*Analytical Sanitary Commission*) from one of which I quote the astounding instance, given above, of variations in the strength of laudanum. Mr. Thomas Taylor, of Vere Street, informs me that, whereas an ounce of laudanum should contain about four grains of morphia, he finds the actual quantity varying in different specimens from two grains to six; and that in two specimens of solid opium, outwardly alike and supposed to be of equal quality, he has found the percentage of morphia to vary from 3½ to 10. It requires ittle instruction in medicine to appreciate these facts.—J. S.

nor except with full registration of the sale, and in the presence of a witness known to both buyer and vender. Admirable, so far as it goes! but why should arsenic alone receive this dab of legislation? Is the principle right, that means of murder and suicide should be rendered difficult of access for criminal purposes? Does any one question it? Then, why not legislate equally against all poisons?—against oxalic acid and opium, ergot and savin, prussic acid, corrosive sublimate, strychnine?

Nor can our past legislators be more boastful of their labours for the *medical profession*—either for its scientific interests, or for the public protection against ignorance and quackery.* Nearly two dozen corporate bodies within the United Kingdom are said to grant licences for medical practice; and I hardly know whether it lessens or aggravates this confusion, that such licences are in many cases partial; that one licentiate may practise north of the Tweed, but nowise to the south; that one may practise in London, another only seven miles beyond it. Not that the licence seems much to matter! for innumerable poachers in all directions trespass on what the law purports to sell as a secured preserve for qualified practitioners: their encroachments are made with almost certain impunity; and—as for the titles of the profession, any impostor may style himself *doctor* or *surgeon* at his will. Even where licences are held, conveying identical titles, they imply neither equal privileges (as I have said) nor even uniform education. The law has troubled itself little as to the terms on which they shall be granted; and the qualifications exacted from candidates—the conditions preliminary to their becoming eligible for licence, vary in so remarkable a degree among the many corporate bodies which are fountains of this honour, that

* Legislative passiveness towards scientific medicine is not the only evil we have to complain of. Surely, in selling Letters Patent for the protection of quack-medicines—in seeming to sanction and authenticate whatever lies their proprietor may post upon the wall, the State demeans itself into complicity with fraud, and soils its fingers with something fouler than the Vespasian tax. It illustrates the curious *forgetfulness* shown towards medicine by the Legislature, that this immoral practice of giving patents for pretended cures of disease should have been allowed to continue—as of course it must have continued, solely by oversight, till past the middle of the nineteenth century.—J. S.

the credentials conferred have really little meaning, apart from a context which the public is unable to supply. It is charged against particular institutions, that their degrees and licences are attained with a very inglorious facility; and when it is recollected that the issuing of such testimonials is a source—sometimes a chief source—of income to the corporations which grant them, it will be felt that at least there must exist great danger of this reproach being sometimes deserved. If a national title to practise medicine is to be granted by several Boards, and if yet the tenure of that title is to determine public confidence in favour of its holder, it would seem indespensable that some guarantee should be given for these several licences representing equal qualifications—some guarantee that the holder in each case possesses professional knowledge, and has enjoyed professional opportunities, at least above some uniform standard recognised as a *minimum* qualification by all the diplomatising bodies. Indispensable, however, as this may seem, years of endeavour have failed to attain it. What is called *medical reform* has been agitated longer than I can remember; and more than one minister has been willing to legislate for its promotion. Unfortunately the very magnitude of the evil has delayed their cure. With the constitution I have described—a system of conflicting jurisdictions, of licences without titles, and titles without licences, how could we escape internal dissension? how escape the antagonism, perhaps the jealousies, of rival corporations and of different professional classes? Home Secretaries have had little leisure to fathom these things to the bottom. Unexamined and unadjudicated by any competent authority, such influences have bewildered public judgment, made statesmen regard us with despair, postponed legislative correction, and maintained us in a state of anarchy and confusion, best to be appreciated when we compare with our own the organisation and government of the legal profession.

And be it noted, how this reacts upon the State. So completely is our Government dissevered from science in general, and, most of all, from the sciences relating to life, that, on such subjects, there exists not for State purposes

anything like a tribunal of appeal. The Legislature recognises no *medical authority*. Occasionally this fact stands out in painful conspicuousness, and brings most injurious results. In contested cases requiring scientific testimony—before Parliamentary Committees, for instance, and in a variety of legal proceedings—instead of the Court having satisfactory power of referring particular questions to skilled impartial adjudicators, the uniform practice is that scientific men are retained on opposite sides to support partisan interests. The advantages, such as they are, which belong to this system, might, I believe, easily be obtained under altered arrangements: the disadvantages are glaring. It might be invidious to refer to illustrations of their reality: but it is, of course, impossible to doubt of the working of this system, that, in so far as it makes each witness feel himself engaged to maintain the views of his employer, it tends towards a moral prostitution and subornation of science. In the interests of truth, it would surely seem desirable that scientific evidence should be tendered, so far as may be, in a judicial spirit towards the suit; either that the technical point should be referred to a technical jury, or that the technical witness should be summoned at the Court's discretion, should be examined in chief by the Court, and should be subject only to such cross-examination as may procure the most complete statement of his knowledge on the matter in hand.

Having said so much on the defects and the wrongs of our existing sanitary condition, perhaps I may venture to speak of the almost obvious remedy. "Almost obvious" I say; for surely no one will doubt that this great subject should be dealt with by comprehensive and scientific legislation; and I hardly see how otherwise, than that it should be submitted in its entirety to some single department of the executive, as a sole charge; that there should be some tangible head, responsible—not only for the *enforcement* of existing laws, such as they are or may become, but likewise for their *progress* from time to time to the level of contemporary science, for their *completion* where fragmentary, for their *harmonisation* where discordant.

If—as is rumoured, the approaching re-constitution of the General Board of Health is (after the pattern of the Poor-law

Board) to give it a Parliamentary President, that member of the Government ought to be open to challenge in respect of every matter relating to health. What, for this purpose, might be the best subordinate arrangements of such a Board, it would take a volume to discuss. But at least as regards its constituted head, sitting in Parliament, his department should be, in the widest sense, to *care for the physical necessities of human life.* Whether skilled co-adjutors be appointed for him or not; engineers—lawyers—chemists—pathologists; whether he be, as it were, the foreman of this special jury, or, according to the more usual precedent of our public affairs, collect advice on his own responsibility, and speak without quotation of other authority than himself, his voice, unless the thing is to be a sham, must represent all these knowledges.

The people, through its representatives, must be able to arraign him wherever human life is insufficiently cared for.

He must be able to justify or to exterminate adulterations of food; to show that alum ought to be in our loaves, or to banish it for ever; to show that copper is wholesome for desert, or to give us our olives and greengages without it; to show that red-lead is an estimable condiment, or to divert it from our pepper-pots and curries.

Similarly with drugs and poisons—the alternatives of life and death—a minister of Public Health would, I presume, be responsible for whatever evils arise in their unlicensed and unregulated sale. He would hardly dare to acquiesce in our present defencelessness against fraud and ignorance; in doses being sold—critical doses, for the strength of which we, who prescribe them, cannot answer within a margin of *cent. per cent.;* or in pennyworths of poison being handed across the counter as nonchalantly as cakes of soap.* Surely, before he had been six months in office, he would have procured some enactment to remedy this long neglect of the Legislature,

* Without referring to what may be considered rare—the sale of poison for the purposes of intended homicide, I may remind the reader of the very dreadful facts collected by the Commissioners on Trades and Manufactures, as to the immense sales of opium in our principal manufacturing towns, for the purpose of quieting—and with the effect of killing, children, while their poor mothers are absent from home in their several occupations.—J. S.

by providing that the druggist's trade be exercised only after some test of fitness, and in subjection to certain regulations.

Within his province, likewise, it would fall to be cognisant of all that relates to the constitution of the Medical Profession. The difficulties which have baffled successive Home Secretaries might soon find their solution in the less divided attention which he could bring to their study. Amid conflicting opinions and an apparent scramble for power, he would soon distinguish where might be the strife of jealousy and covetousness, where a truthful zeal for the honour and efficiency of medicine. I think he could not be long in curing our more scandalous anomalies. Probably—unless human bowels require other doctoring in London than in Manchester, he would manage that a doctor there should be a doctor also here; that no licence for the partial practice of medicine should be recognised—no licence admitting a man to do in Edinburgh what it would be a misdemeanour for him to do in Greenwich. And obviously, in order to this—since a professional diploma is the only criterion by which the public can measure the competence of those who seek their patronage, he would see that, as far as may be, the various licensing bodies exact from their candidates equal and sufficient qualifications; that the diploma entitling a man to call himself Surgeon or Physician, Accoucheur or Apothecary, mean the same thing—imply the same education, whether it be got in Scotland, Ireland, or England; and that any falsification of such diploma, or any unauthorised assumption of the title which implies its possession, be promptly punishable at law.*

* This check at least seems indispensable, for the reason above given, that a professional diploma is the only criterion by which the public can measure professional competence; and for the validity of such a criterion, it therefore, I think, becomes the duty of a government, on behalf of the public, to provide. For anything beyond this (except in one particular case) the matter might take its natural course. No law can supersede a necessity for common sense in the subject; and medicine, I think, requires no *protection*. Let my neighbour, by all means, if he desire it, send for a greengrocer to reduce his dislocation or assuage his gout! and let him take the consequences of his folly, in a spoilt limb or in a hair's breadth escape with his life. Only—let the greengrocer be punishable, if he seek this office under false pretences, calling himself by any title which implies a professional qualification. And, for what harm he may do —let him of course (as would, if necessary, the presidents of our colleges) be prepared to abide before judge and jury his trial for malpractice. But, in strict

Into the hands of this new minister—advised, perhaps, for such purposes by some permanent commission* of skilled persons, would devolve the guardianship of public health against combined commercial interests, or incompetent administration. He would provide securities for excluding sulphur from our gas, and animalcules from our water. He would come into relation with all Local Improvement Boards, in respect of the sanitary purposes of their existence. To him we should look, to settle at least for all practical purposes the

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adhesion to the principle I have professed, that protection is wanted, not for the profession, but for the public, I would suggest one exception to what otherwise might be universal free-trade in medicine. I refer to the case of druggists; who, whenever the Legislature may awake to the necessity of regulating their trade, ought, I think, to be expressly prohibited from the treatment of disease. To an immense majority of our population—to all the under-educated classes, the druggist's shop appears an emporium for medical skill, as well as for medical appliances. They probably have some vague over-estimate of our art of healing, and think perhaps that the several bottles on the shelf correspond to the several ailments they can specifically cure. They ask for something "good for a dropsy," or "good for a wasting," or "good for a palpitation;" not knowing how much skill may be requisite to interpret the symptom; not knowing that, to our highest skill, there is no medicine thus indiscriminately, or even generally "good." At present almost universally, druggists, with no medical qualification, are tampering more or less with serious medical responsibilities; and the mischief thus occasioned—especially among the poorer classes, is a matter of notoriety, on which persons engaged in hospital practice would be competent and tolerably impartial witnesses. It is because this evil arises in the *almost inevitable ignorance* of those who chiefly suffer from it, that, in accordance with the principle above suggested, I think it deserves consideration from the Legislature.—J. S.

* There are many instances in my mind, some already adverted to, where the existence of a standing jury for scientific—especially for sanitary, purposes might be of great utility. It is an organisation which prevails extensively in France, under the name of *Conseils de Salubrité;* forming, in most of the large towns there, a constant board of reference for the municipality, in respect of sanitary regulations. *Mutatis mutandis,* it might become invaluable as an English institution, in respect of many matters touched upon in this sketch; and perhaps with some division of duties, into such as would best belong to a General Board of the kind, and such as might properly be vested in Local Boards. To determine the indespensable conditions of healthy lodgment; to examine the influence of trades and occupations, and to devise the regulations they may require, for the neighbourhood's sake, or for their operatives'; to supervise the sale of food and drugs; to be cognisant of medical matters; would seem, either locally or generally, to require the co-operations of several skilled persons. But, though I have spoken of such, as indispensable jurors for these subjects, I do not forget that other interests than those of life may need to be consulted. For the fair representation of these, the lay faculty of *educated common-sense* will fulfil an inestimable usefulness, if it may be there to mediate between science, which is sometimes crotchety, and trade, which is sometimes selfish.—J. S.

polemics of drainage and water-supply; to form opinions which might guide Parliament, whether street sewers really require to be avenues for men, whether hard water really be good enough for all ordinary purposes, whether cisternage really be indispensable to an urban water-supply.

Organisations against epidemic diseases — questions of quarantine — laws for vaccination, and the like, would obviously lie within his province; and thither, perhaps, also his colleagues might be glad to transfer many of those medical questions which now belong to other departments of the executive—the sanitary regulation of emigrant ships, the ventilation of mines, the medical inspection of factories and prisons, the insecurities of railway traffic, *et hoc genus omne.*

There is another subject respecting which I should reluctantly forego the present opportunity of saying something. To the philosopher, perhaps, any partial sanitary legislation—even for a metropolis, may seem of low importance, as compared with our commanding need that the general legislation of the country be imbued with deeper sympathies for life. Yet London is almost a nation in itself; and the good which might be effected by its sanitary regeneration would, even as example, be of universal influence. Now, at this moment, there seems a chance—such a chance as may not soon recur—for gaining a first step towards this consummation. The reconstruction of the Metropolitan Commission of Sewers, on the principle of local representation, affords extraordinary facilities for providing London, at length, with an efficient sanitary government. For, while any administration for this purpose would require to be entrusted with very extensive and very stringent powers, it seems probable that such authority might by the public be willingly conceded to a body constituted, in great part, of persons representing local interests. The jurisdiction required would be substantially such as is already vested in the City Commissioners of Sewers, for the sanitary control of the City; the concession of which—because to a representative body—was never any matter of municipal dispute. In so vast a government as that of the metropolis, Local Boards of Health for its various sections would seem indispensable; it is presumed that these

boards* would be represented in the general Commission; which, in conjunction with them, and including certain skilled assessors, might constitute a complete sanitary organisation, consultative and executive.

I have one word more to say about the Reports. They have been received by the public with such remarkable indulgence and favour, that I feel some anxiety lest I may seem to have plumed myself with other feathers than my own. Let me, therefore, at least in part, confess my debts.

Before my first enlistment in the service of public health, others had fought this great cause with rare courage and devotion; establishing its main principles in a manner to require no corroboration, and to admit little immediate increase. The true patriarchs of the cause in this country are the present working members of the General Board of Health. The constitution of my City appointment is quite independent of this Board; but I should be acting an unworthy part if I refrain from acknowledging, that, in innumerable instances, I have gathered most valuable knowledge from the Board's official publications, and that, in personal intercourse with its members and officers, I have had abundant reason to be grateful for information invariably given with that frank kindness which belongs to brotherhood in science, and to sympathy for common objects.

I must likewise acknowledge constant obligations to the courtesy of the Registrar-General, and express with how much pleasure and instruction I have studied the works of his inestimable office. Especially I would offer my tribute of respect to Dr. Farr's learning and industry, as well as to that capacity for generalisation which the world has long recognised in his eloquent and thoughtful writings.

And, though this be not the place to boast of private

* It would seem premature to discuss what might be the best constitution of such Local Boards for the metropolis; but it will appear to the reader, on a moment's reflection, that there would be no difficulty in finding materials for their organisation. If, according to suggestions lately ventilated, municipal institutions should be given to the parts of London hitherto without them; these new corporations would probably have sanitary functions allotted them, and might readily become Local Boards of Health under such a constitution as I have sketched. If, on the other hand, our present non-municipal system were to be continued, probably our several Boards of Guardians might seem specially proper to act as Local Boards of Health; first, as being elected representative

friendships, I may venture to say that there are few topics relating to sanitary medicine that I have not enjoyed the advantage of discussing with men who have given genius, inquiry, and reflection to their development.

Thank God! the number of persons capable of apprehending the cause, and ready to take interest in its promotion, is now daily on the increase. If some minister of Public Health could take his seat in the House of Commons—some minister knowing his subject and feeling it, I believe he would find no lack of sympathy and co-operation. The world abounds with admirable wishes and intentions, that vaguely miscarry for want of guidance. How many men can get no farther in their psalm of life than the question, *in quo corriget.* To such—not masters of the subject, but willing and eager to be its servants, an official leader might be everything: for in great causes like this, where the scandal of continued wrong burns in each man's conscience, the instincts of justice thirst for satisfaction. What can we do or give—how shall we speak or vote, to lessen these dreadful miseries of sanitary neglect—is, at this moment, I believe, the fervent inquiry of innumerable minds, waiting, as it were, for the word of command to act.

How much of this generous earnestness towards the cause exists in society—how much desire to grasp any reasonable opportunity of good has lately happened to fall under my notice. Last winter, when the signs of the times were making us fear that Cholera would presently again be epidemic in London, it was remembered that, in the greater part of the metropolis, nothing whatever had been done since the last invasion to give immunity against the returning disease. It was remembered—too late, how indescribably dreadful a

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bodies, already invested with certain authority of the kind—as, for instance, under the Nuisances Removal Act; secondly, because various of their officers would be almost indispensable parts of any sanitary machinery. Indeed, my experience of such matters suggests it to me as not unimportant, that, under any arrangement which may be made, the jurisdiction of Local Boards of Health should, at least in area, be conterminous with Poor Law Unions; so that those who administer sanitary affairs—affairs which are always chiefly relative to the poor—may, as far as possible, in their several districts, come into relation with single sets of Poor Law officers.—J. S.

thing is the epidemic prevalence of sudden death. And the poor were thought of—in their unprotectedness, their filth, their ignorance. Among the persons thus aroused, was a gentleman whom I reluctantly leave unnamed; saying of him only, that, from a distinguished position in official life, he had retired to literary enjoyments, amid which he bears the imputation of many unacknowledged writings which charm and instruct the public. When the rumours of the pestilence began, he too heard and read and became aghast. The notion that "in a skilful, helpful, Christian country nothing should be done" against these impending dangers—that the poor should be left "defenceless, huddled together in some dismal district, not more helpful than women"—was felt by him, he wrote, "deeply as a disgrace;" and he pleaded that, "on a great and pressing occasion, it remains for the thoughtful, the rich, and the benevolent, to try and do these needful things for the people."* Let us, he urged, endeavour to meet this shameful reproach; let us combine voluntary charitable assistance for extemporaneous sanitary measures, rapid, though partial; let us get a hundred thousand pounds and do what we can in aid of local authorities in the poorest districts—in Bethnal Green, in Shoreditch. Eventually this plan was abandoned, at least for the time. There was argued against it, that prompt legislation might do more good, with less exoneration of local responsibility. Whether rightly or wrongly, the latter view was acted on; and in accordance with it, the gentleman first adverted to (waiving his own hopes and wishes in the matter) took active part in framing suggestions,† which Lord Palmerston had expressed himself willing to accept, for modifying the laws of Nuisance and Disease-Prevention to a form more suitable for the apprehended emergency. But, in the meantime, what had happened? The author of the plan, as it were at a moment's notice, had seemed to draw round himself half the intellectual and moral strength of the

* I quote from a pamphlet printed by him for private circulation. It was entitled "*Health-Fund for London; some thoughts for next Summer: by Friends in Council.*"—J. S.

† These have since been laid before the House of Lords, on the motion, I think, of Lord Harrowby, who took much interest in the subject.—J. S.

metropolis. Himself setting aside the literary ambition of his life, he found others ready to meet him with their several self-sacrifices. Over-worked men of science and of business, who afford no time to relaxation; favourites of society, who might have been suspected of mere shuddering at distasteful subjects; men of high laborious rank in Church and State; poets; heads of professions; minds that guide the tastes and morals of the country, or feed its imagination; not least, the invalid from his distant wintering-place; men, in short, immersed in all kinds and grades of occupation, were either bodily present at the deliberations referred to, or were writing about the plan in terms of warm interest, anxious to promote whatever usefulness could be shown them. About the means there was discussion—about the object, none; nor lukewarmness. All were competing, by gifts of time and labour, to snatch some opportunity of serving this neglected cause.

Such—to return to my text—such, I am deeply assured, would be the spirit which a Minister of Public Health would find abundantly on his side in Parliamentary discussion, and in the Press. There is no attachment to the incongruities I have sketched as belonging to our abortion of a sanitary system. Still less is there any want of feeling for the poor—any reluctance to raise their state and better their circumstances—any unconsciousness that these things are great solemn duties. On the contrary, everywhere there is the conviction that *something* must be done; everywhere a waiting for authority to say *what*. But, the trumpet giving an uncertain sound, who can prepare himself to battle? Knowledge, and method, and comprehensiveness, are wanted—the precise, definite, categorical impulses of a Parliamentary leader, who can recognise principles and stick to them.

And for such a minister, what a career! It would be idleness to speak of the blessings he could diffuse, the anguish he could relieve, the gratitude and glory he could earn. A heathen can tell him this:—*Homines enim ad Deos nullâ re propius accedunt quam salutem hominibus dando: nihil habet nec fortuna tua majus quam ut possis, nec natura tua melius quam ut velis, conservare quam plurimos.*

[In the foregoing essay on a Ministry of Health, which was written in the form of a Preface to the Volume of the City Reports, Mr. Simon gave expression to the views which he kept steadily before him throughout his official career. The "physical interests of the people" should be the care of such a minister, just as the educational interests of the people are the care of the Minister of Education. The term physical interests of the people embraces, of course, guardianship of the poor, but the policy which Mr. Simon consistently advocated was of a much broader kind than that which was dictated by the traditions of the Poor Law Board of this country.—ED.]

HISTORY AND PRACTICE

OF

VACCINATION.

HISTORY AND PRACTICE OF VACCINATION.

TO THE RIGHT HON. THE PRESIDENT OF THE GENERAL BOARD OF HEALTH.

SIR,

YOU have desired me to lay before you, to the best of my judgment, such medical facts and considerations as will assist you in estimating the hygienic value of Vaccination, and the strength of any objections which have been alleged against its general adoption.

Accordingly, I have now the honour of bringing to your notice, as an Appendix to this Letter, a mass of material which will, I believe, justify conclusions on the very important subject to which they relate.

That appended material is as follows:— Enumeration of appended documents.

A. The evidence which, in 1802, was given by Dr. Jenner before a Committee of the House of Commons appointed to consider his claims to a public reward;

B. The Report subsequently made by the said Committee;

C. A Report which, in reference to certain assertions made in disparagement of Vaccination, was issued, in 1806, by the medical council of a "Royal Jennerian Society," then existing;

D. A Report on Vaccination which, in 1807, at His Majesty's command, was made by the Royal College of Physicians of London;

E. A paper extracted from the Transactions for 1852 of the Royal Medical and Chirurgical Society of London, and entitled "On the Protection against Small-pox afforded by Vaccination, illustrated by the Returns of the Army, Navy, and Royal Military Asylum," by T. Graham Balfour, M.D., Surgeon to the Royal Military Asylum, Chelsea;

F. A paper extracted from the Transactions for 1853 of the same Society, and entitled "An Analytical Examination of all the Cases admitted, during Sixteen Years, at the Small-pox and Vaccination Hospital, London, with a view to illustrate the Pathology of Small-pox, and the protective influence of Vaccination, in degrees varying according as the Vaccination has been perfectly or imperfectly performed," by J. F. Marson, Esq., Resident Surgeon to the Hospital;

G. The Petition of Mr. Marson to the House of Commons, in 1856.

H. A communication from Dr. Greenhow, Lecturer on Public Health at St. Thomas's Hospital, in reference to the present death-rates of London, at different ages and from different diseases, as compared with the corresponding death-rates at the end of the 17th and in the middle of the 18th century;

J. A long succession of Answers to certain Questions which, with a view to my present object, have been circulated among distinguished members of the medical profession, extensively in the United Kingdom, and partially in France and Germany;

K. Information communicated by the several Governments of France, Austria, Prussia, Sweden and Norway, Denmark, Portugal, Bavaria, Baden, and Wirtemberg, and by certain of our own Public Departments; stating, in reply to similar Questions, what has been the public experience of Vaccination in each country addressed.

As prefatory to these documents, I am instructed to submit to you my own reflexions on the subject; and in proceeding to this task, I believe I shall best fulfil your object by discussing, in turn, each of the following questions:—

Heads of proposed inquiry.

(I.) What kind of an evil was small-pox before vaccination arose to resist it?

(II.) What facts and arguments led to the first sanction of vaccination, and to what sort of inquiry were they subjected?

(III.) What further knowledge, at the end of half a century's experience, has been gathered on the protective powers of vaccination?

(IV.) What evils have been shewn to attend its practice, and to counterbalance its alleged advantages?

(V.) How far are there realized, in this country, those benefits which can reasonably be expected from the general use of vaccination?

I.—Small-pox before the Discovery of Vaccination.

You will not, I trust, think it irrelevant that I begin by referring to the history of small-pox. To the civilised classes of society, it has now almost ceased to be a fatal disease; and among them, accordingly, there is a temptation to forget how their fathers and grandfathers regarded it. Hence, in the middle of the 19th century, the very success of vaccination may have blinded people to its importance. It is so easy to be bold against an absent danger—to despise the antidote while one has no painful experience of the bane.

Dangers of natural small-pox.

Yet indeed, apart from historical records, our present daily experience of the nature of the disease might almost enable us to construct a description of the course which it has run. To know of it, that it is *fatal to a very large proportion of those whom it attacks;* that it is *eminently infectious from person to person;* and that it *seizes, with very few exceptions, on all who for the first time come within its range;*—this, if one reflects on it, is almost to have read the story of its ravages; and their details may be conjectured.

Among remote populations.

To remote or insular populations, having infrequent and difficult intercourse with the busier masses of mankind, such an infection would come seldom; but, having come, it would find, perhaps, the entire generation prone to receive it. There might have been no previous visitation within living memory. None of the population would have earned exemption by having suffered in a former epidemic. The disease, under such circumstances, must have ravaged more fiercely than the most ruthless of human wars: its effects on mankind must have been comparable to that obliteration of vegetable life which ensues when the army of locusts, descending on

pastures and vineyards, and sweeping onward with fatal procession, converts into the likeness of a desert what just before was all freshness and fertility.

In every country, probably, its first invasion has been of this kind; and its recurrences, when far apart, have been of equal malignity. Thus it was that in 1518, following European adventure to the Western world, it concurred with fire and sword and famine and bloodhounds to complete the depopulation of St. Domingo;* thus, that soon afterwards, in Mexico, it even surpassed the cruelties of conquest, suddenly smiting down 3½ millions of population and leaving none to bury them;† thus, that in Brazil, in the year 1563, it extirpated whole races of men; thus, that about the same period, in the single province of Quito (according to de la Condamine) it destroyed upwards of 100,000 Indians. And thus, too, it has been in later days that Siberia and Kamschatka‡ have been ravaged; thus, that again and again, till very recent times, the same dreadful pestilence has depopulated Greenland

* "Variolarum morbilli eis ignoti hactenus . . . qui tanquam morbosas "pecudes contagioso halitu eos invaserunt." (Pet. Mart. Angler. de Orbe Novo, decad. iv. c. 10.)—Not six and twenty years had passed since the island (then containing a million of Indians) had been discovered by Columbus, who received from the inhabitants an amount of kindness and hospitality which touched him to the heart, and whose language, in describing them, gives singular pathos to the thought of their then impending misery and extinction.—Comp. Helps's "Spanish Conquest in America," I. 124.

† "*No habia quien los enterrasse*" are words which Mr. Prescott quotes from Sahagun's History. Mr. Prescott ("Conquest of Mexico," v. 6) describes this terrible epidemic as "sweeping over the land like fire over the prairies, smiting "down prince and peasant, . . . leaving its path strewn with the dead bodies of "the natives, who (in the strong language of a contemporary) perished in heaps "like cattle stricken with the murrain." Dr. Stricker (Oppenheim's Zeitschr., vol. xxxiv.) gives information about several later epidemics in Mexico. He states that in 1779 its ravages were dreadful; that it then occasioned in the capital alone nearly 9,000 deaths out of nearly 39,000 attacks; and that in 1797 again it caused in the city 4,451 deaths out of 24,516 attacks. With these records he contrasts what has happened since the introduction of vaccination; that in 1829–30, when small-pox was most severely epidemic, vaccination was almost always protective; and that in 1830–1 there died in New Leon 1,740 persons, without a single vaccinated person contracting the infection.

‡ Pallas (Reisen, St. Petersb., 1770) makes mention more than once of the small-pox in Siberia; and in reference especially to the Ostjaks (Vol. iii. p. 50) describes it as the chief obstacle to an increase of their population. Captain Cook (Voyage to the Pacific Ocean, Lond. 1785, p. 365) speaks of the small-pox at its first appearance (1767) in Kamschatka as "marking its progress with ravages not less dreadful than the plague, and seeming to threaten "their entire extirpation."

and Iceland.* Before the terror of its presence, communities literally dissolved themselves;† and the well-known description of the plague at Athens does not convey more dreadful images of human suffering than may be gathered from the writings of those travellers ‡ who, even to the latest times,

* A subjoined official communication from Denmark (App. p. 173) gives interesting particulars of various visitations which have befallen Iceland and Greenland. As late as 1734, Greenland suffered its first epidemic of small-pox, when nearly two-thirds of the inhabitants were swept away. In Iceland the disease had been known from much earlier times; but, in its eighteenth visitation (1707) it is said to have destroyed 18,000 persons out of a population of about 50,000. In Crantz's History of Greenland (London 1767, i. 335-7) may be read terrible details of the epidemic just adverted to: "Empty depopulated "houses and unburied corpses, some within and some without the houses," are described; and "in one island they found only one girl with the small-pox upon "her, and her three little brothers; the father, having first buried all the people "in the place, had laid himself and his smallest sick child in a grave raised "with stone, and ordered the girl to cover him." Sir George Mackenzie (Travels in Iceland, Edin. 1811, p. 409) referring to small-pox in Iceland, says, "its ravages have been such as to render this disease important even in the "political history of the island."

† It is said (Ring, Treatise on Cowpox, p. 994) that after such a dispersion the capital of Tibet once remained for three years without inhabitants. The same author (p. 604) describes that about the end of last century a tribe of Esquimaux on the Labrador coast was put to flight by the outbreaking of small-pox, and did not venture to return for three years; when their country had "become a desert without a living soul in it, but they found the skeletons of "500 persons who had fallen victims to that horrible disease." Incidents of this kind may be found abundantly mentioned by travellers to whom I have referred, and Dr. Mead (Works, p. 311) describes the Hottentots on a particular occasion as drawing lines of defence against any communication with the sick, and shooting all who attempted to pass.

‡ Striking accounts of its ravages among the North American Indians, in very recent times, may be gathered from Catlin's "Letters and Notes on the "Manners, Customs, and Condition of the North American Indians" (Lond. 1841) as especially at vol. i. pp. 6, 80, 99, 213; vol. ii. pp. 24–5, 43–4, 161, 238, 255; and App. A. At the first-mentioned of these passages, Mr. Catlin observes, "Thirty millions of white men are now scuffling for the goods and "luxuries of life over the bones and ashes of twelve millions of red men, six "millions of whom have fallen victims to the small pox, and the remainder to "the sword, the bayonet, or whiskey." And in another place (ii. 255) he adds, "I would venture the assertion, from books that I have searched and from other "evidence, that of the numerous tribes which have already disappeared, and of "those that have been traded with, quite to the Rocky Mountains, each one has "had this exotic disease in their turn, and in a few months have lost one half "or more of their numbers." Washington Irving's "Astoria" also makes mention of recent dreadful outbreaks, in which "almost entire tribes" have been destroyed; and I subjoin from a third source some details which both confirm and illustrate the above. *See Note* I., p. 304: Ravages of Smallpox among American Indians.

have witnessed the power of natural small-pox against remote unprotected populations.

In civilized countries.

While such was small-pox in the less travelled parts of the world, it seems certain that in civilized Europe, with its constant intercourse of towns and countries, the disease was at least as deadly. Its strength, indeed, was differently distributed. Not—as in Greenland—only twice or thrice in a century, but with one incessant process, that fatal sickle was ever in motion, and the increments of harvest were from day to day. Instead of coming after long absence on masses of population entirely unprotected against the infection, the disease recurred in each place so frequently that, for the most part, at any given moment, a more or less considerable majority of the inhabitants would have faced the danger before. They would have obtained against its attacks that protective exemption which was generally the good fortune of survivors. But it is a moderate computation, that for every five persons thus, at the price of much past suffering, almost secured against the disease, one at least must have died. The annual ravages of small-pox in Europe* alone, have been estimated at half a million of lives. M. De la Condamine†

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* Dimsdale, who went to St. Petersburg to inoculate the Empress Catherine, talks (Tracts, St. Petersb. p. 119) loosely, and probably with exaggeration, of *two millions* as the annual mortality of the Russian empire from small-pox; and he mentions that on one occasion, going in search of virus to a village where small-pox had been prevailing, he found that of 37 patients all but 2 had died. Clarke (Travels) speaks of the small-pox mortality of China as "incalculable." Maitland, the first English inoculator, says of natural small-pox in the Levant that in some years it is "a kind of plague that sweeps away at least a third of "those who are seized with it." And Holwell (Account of Manner of Inoculating for the Small-pox in the East Indies, London, 1767, p. 4) gave the following description of its ravages in Bengal:—"Every seventh year, with scarcely any "exception, the small-pox rages epidemically in these provinces during the "months of March, April, and May, and sometimes until the annual returning "rains about the middle of June put a stop to its fury. On these periodical "returns (to four of which I have been a witness) the disease proves universally "of the most malignant confluent kind, from which few, either of the natives or "Europeans, escaped that took the distemper in the natural way, commonly "dying on the first, second, or third day of the eruption. . . . The usual "resource of the Europeans is to fly from the settlements and retire into the "country before the return of the small-pox season."

† Mémoire sur l'Inoculation de la Petite Vérole, 1754; or English edition (with additions from the author) by Dr. Maty, 1755. De la Condamine, estimated that small-pox "destroys, maims, or disfigures the fourth part of mankind."

reckoned that in France a tenth of the deaths were by small-pox; Rosen's estimate of Sweden was to the same effect. For our English experience, there exist only imperfect records; but it seems that, within the London Bills of Mortality, small-pox, when not at its worst, averaged a fourteenth* of the annual total of deaths; a fourteenth, too, at times when that total, as compared with the population, represented perhaps double our present death-rate.

Illustrated in royal families.

For a popular notion of the disease, it may be enough to cite what it did in royal families.† In the circle of William the Third, for instance: his father and mother died of it, and, not least, Mary, his wife; also his uncle, the Duke of Gloucester; also his cousins, the eldest son and the youngest daughter of James the Second; while he himself (like his friend Bentinck) had suffered from it most severely, barely surviving, with a constitution damaged for life.‡ Again, in the Court of Austria: "Joseph the First (says Vehse) was "carried off, when not more than thirty-three years of age, "by the small-pox; to which in the course of the eighteenth "century, besides him, two empresses, six archdukes and "archduchesses, an elector of Saxony, and the last Elector "of Bavaria, fell victims."§ To this list might have been

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Williams (Elements of Medicine, I., p. 202) quotes the French Minister of the Interior as estimating (Report on Vacc. 1811) the former annual mortality by small-pox to have been 150,000 persons. Others (comp. Ring op. cit. 700) state it at a very much smaller though still enormous amount.

* See Dr. Jurin's "Letter containing a Comparison between the Mortality of the natural Small-pox and that given by Inoculation," Lond. 1723. His estimate is formed on the Bills of Mortality of the forty-two years 1667–86 and 1701–22; the intermediate years 1687–1700 being left out because in them measles and small-pox were not distinguished.

† Extensive fatality of any particular disease in single families can of course rarely be known, except where the house is of historical importance; but the same sort of thing must have been frequent in all classes of society. In one of Horace Walpole's letters (April 2, 1750) we read—"Lord Dalkeith is dead of the "small-pox in three days. It is so dreadfully fatal in his family, that, besides "several uncles and aunts, his eldest boy died of it last year; and his only "brother, who was ill but two days, putrefied so fast that his limbs fell off as "they lifted the body into the coffin."

‡ Burnet says of him:—"He was always asthmatical, and the dregs of the "small-pox falling on his lungs, he had a constant deep cough."

§ There were two words which Prince Kaunitz would not allow to be uttered in his presence: "Death" was one, "Small-pox" was the other.

added, no doubt, many other names; among them, for instance, a dauphin (1711) and a king (1774) of France, a queen (1741) of Sweden, and an emperor (1727) of Russia. It would be thought an awful epidemic now-a-days, that should strike like this in high places.

Mutilation and subsequent ill-health of many who were not killed.

Yet the ravages of small-pox are not half enumerated in the list of the myriads whom it killed. From the earliest to the latest medical records of the disease, there is constant mention of the tax which it levied upon survivors.* Among those who outlive it (says De la Condamine) many either totally or partly lose their sight or hearing; many are left consumptive, weakly, sickly, or maimed; many are disfigured for life by horrid scars, and become shocking objects to those who approach them. Another learned writer of the same period, after describing these frequent sequels of the disease, says that its very nature is one *quæ nullâ furcâ sese expelli patitur, sed usque recurrit.*† Sir Gilbert Blane‡ at a later period quoted a Report of the Hospital for the Indigent Blind, to the effect that two-thirds of those who applied there for relief had lost their sight by small-pox. Worst of all were these ill effects in persons already of feeble, especially of scrofulous constitutions. Nothing (says Dr. Gregory) developes that tendency more certainly than protracted small-pox.§

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* De la Condamine, op. cit. p. 57. "As sequelæ of small-pox Dr. Willan "enumerates glandular swellings, ulcers (often gangrenous) about the thighs, "scrotum, and knees, puffy tumours of the soft parts, enlargement of the "bones, stiffness of the joints, ophthalmia, deafness, cough, dyspnœa, diarrhœa, "anasarca, hydrothorax."—Williams, loc. cit.

† Tralles, de Insitione Variolarum, 1765, p. 159, who begins his account by saying:—"Ab illo ævo quo innotuére variolæ ad hunc diem myriades exem-"plorum prostitêre, tristium vestigiorum que in corpore humano omnibusque "ejus partibus illæ post se reliquerunt."

‡ Medico-Chirurg. Transact., vol. x., p. 326. Similarly, Dr. Gregory writes that a large proportion of the blind have been found to owe their misfortune to the secondary fever of small-pox.

§ "Accordingly, in scrofulous constitutions we see secondary fever com-"plicated with strumous ophthalmia, characterized . . . . by obstinate resistance "to every kind of remedial treatment. Irritable ulcers form under the lower "eyelid, and around the knee, ankle, and elbow joints, and are found very "difficult to heal. Glandular enlargements of the neck take place which some-"times suppurate, but oftener continue indolent and of stony hardness. Children "frequently suffer from otitis." Gregory, op. cit. p. 741.—"On parle de quelques

Habitual fears of the disease.

It is scarcely needful to say, of the disease I have described, that it was among all civilized nations a constant source of terror. Each time that the contagion was re-introduced to a place, all who had not been touched in previous visitations (including especially such children as had been born in the interval) might expect to become subjects of attack. Accident in individual cases might delay this dangerous moment, but for nearly all it was only delay.* Of persons not prematurely cut off by other diseases, in the long run very few escaped this infection.† Seventy years of age were no security; and for such as were disposed to triumph at the end of an epidemic which had spared them, there was often quoted the old saw, *Nemo ante obitum beatus.* Thus at every rumour of the disease, men might tremble for the valuable lives of others‡ or for their own; and that horror of the

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" individus scrofuleux dont l'état s'est amélioré sensiblement à la suite de la " variole; mais nous avons rarement eu l'occasion de vérifier ce fait à l'Hôpital " des Enfans. Une circonstance qui nous a, au contraire, frappée, c'est que les " affections scrofuleuses graves et la phthisie pulmonaire reçoivent ordinairement " de la variole une impression défavorable : presque toujours alors leur marche " est accélerée, et leur terminaison funeste suit de près."—Guersant et Blache, Dict. de Méd., art. *Variole.* See also to the same effect, Rayer, Maladies de la Peau, tome i., p. 522; and Lugol, sur les Causes des Maladies Scrofuleuses, p. 220. It deserves notice that Jenner, in his first publications, laid great stress on these, then notorious, after-effects of small-pox.

* Mr. Cross, in his account of the variolous epidemic in Norwich (p. 15), says—"In several instances I have met with severe small-pox in adults who had " at various times, both in Norwich and in London, resisted the intimate and " continued exposure to the contagion of that disease, and who supposed, with " some appearance of reason, that they should for ever be free from it." And he subjoins the following anecdote, derived from one of the Suttons, who are mentioned in it:—" A man who believed himself to have had the small-pox lived " for *twelve years* as nurse in the establishment for the reception of inoculated " patients which the Suttons had near Norwich, continually waiting upon the " patients who were undergoing the disease; and at the end of that time he " caught the small-pox, of which he died."

† " All mankind, with few exceptions, are susceptible of the variolous poison " at some period of their lives . . . . . A few persons pass through a long life " apparently insensible to or insusceptible of the small-pox virus. It is a curious " and important circumstance, that, so far as is yet known, such constitutions " exhibit a like inaptitude to receive and nourish the vaccine disease."—Gregory, in Cyclop. Pract. Medicine, iii. 744.

‡ E. g. "The small-pox raged this winter (1694–5) about London, some " thousands dying of them, which gave us great apprehension with regard " to the Queen, *for she had never had them.* In conclusion she was taken " ill . . . . ."—Burnet's History.

living patient, which so loathsome an infliction occasioned, became, when death had ended his sufferings, a very panic towards his corpse.*

Commencement of 18th century.

Perhaps at no previous moment of English history had the horror of small-pox been greater or more fully justified than at the beginning of the last century.

Inoculation of small-pox.

And now for the first time there came to us a story that we could, so to speak, make terms with this loathsome and murderous enemy; that, by receiving it of our own accord, we could disarm it; that we could (as it was expressed) "buy "the small-pox" cheap; that the susceptibility to contract its fatal infection could be exhausted by artificial means, giving, indeed, the disease, but giving it so mildly, that life was almost unendangered in the process.

This, indeed, was substantially the fact; and to the present time it remains one of the most interesting and least explained facts in pathology, that the specific contagion or ferment of small-pox, so uncontrollable in its operations, when it enters a man in the ordinary way of his breathing an infected atmosphere, becomes for the most part disarmed of its virulence, when it is artificially introduced to the system through a puncture of the skin; so that a person exposed to this artificial infection very generally contracts the disease in its mildest and most tractable form.†

Introduction of the practice in England.

This practice, subsequently known in England as inoculation for the small-pox, seems to have been followed for ages

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* Witness Saint Simon's account of the Grand Dauphin's death:—"La "Vallière fut le seul des courtisans qui, ne l'ayant point abandonné pendant "sa vie, ne l'abandonna point après sa mort. Il eut peine à trouver quelqu'un "pour aller chercher des Capucins pour venir prier Dieu auprès du corps." Or Besenval's description how, on a different occasion, when Louis XV. had been huddled into his coffin, "quelques prêtres, dans la chapelle ardente, furent les "seules victimes condamnées à ne pas abandonner les restes d'un roi qui .... &c."

† Moore's Hist. of Small-pox, p. 218 et seq.; also communications by Timoni and Pylarini in the Philosoph. Transactions, Nos. 339 and 347; also Kennedy's Essay on External Remedies, 1715; and Maitland's Account of Inoculating the Small pox, 1722. In Kennedy's work, p. 157, mention is made of "some parts "of the Highlands of Scotland, where they infect their children by rubbing "them with a kindly pock, as they term it;" and the attractive estimate given of such inoculated small-pox is, that "it need be no more minded than as in "giving or taking the itch."

in the East. Not only, it is said, had the Chinese since the sixth century been accustomed to procure, by special means of their own, an artificial infection of the disease; but the Brahmins from remote antiquity had practised the very operation which was now to be discussed in England. The practice is stated also to have been in vogue in Persia, Armenia, and Georgia, and to have spread as a popular custom, not only about the shores of the Mediterranean, but even to those of the Baltic, to Scotland, and still less accountably to Wales. It was not thus, however, that the discovery first became notorious in England, but in the years 1714–1716 communications on the subject were published in London by members of the medical profession who had witnessed in Constantinople and Smyrna the great success of the practice; and in 1717 Lady Mary Wortley Montague's well-known letter (xxxi.) from Adrianople effectually awakened the public curiosity. Yet by her example, even more convincingly than by her pen, did Lady Mary introduce the knowledge of inoculation; for while still resident in Turkey she shewed her faith in it by submitting her son to the operation; and four years afterwards, having meanwhile returned to London, she had the first demonstration of the Eastern practice made here, almost publicly, on her daughter. The result being most satisfactory, others were soon encouraged to repeat the experiment; and in 1722 (after a preliminary experiment on seven condemned criminals) the critical course was taken of inoculating two children of the royal family.

From this time the inoculation of small-pox possessed a recognized though not an uncontested place in medical practice.

Not uncontested, for innumerable absurd objections were raised, which much interfered with its general adoption. It was said to be wicked and irreligious, and to savour strongly of magic, to promote vice and immorality, and to be an inspiration of the devil.* It was said to instil a vicious

Objections raised against its use.

* See Massey's Sermon against the dangerous and sinful Practice of Inoculation, Lond. 1722, where, *inter alia*, it is written—"Let the atheist and the "scoffer, the heathen and the unbeliever . . . inoculate and be inoculated." This author regards natural small-pox as an useful check on "the encrease of

humour without establishing an issue for its discharge; still worse, to be the means of introducing syphilitic and other infections into the body, and of exciting scrofula and consumption. Inoculating surgeons (it was urged) ought to be cut off, as poisoners, from the professional community.

Besides all this nonsense, there were objections, exaggerated but not unfounded, against a practice which sometimes occasioned death to the subject of the operation. It could not be denied that the worst possible forms of small-pox did sometimes, though rarely, ensue on this proceeding. Thus, in the first eight years there were inoculated in England only 845 persons, of whom seventeen had died; and in Boston, United States, there had been an equal amount of failure among the earlier experiments. It might not unreasonably be urged that this was a large risk to incur in the pursuit of a somewhat uncertain good; for, said the objectors, there is no absolute security given by it against subsequent attacks of small-pox.* But as improvements were progressively made in the methods of managing inoculated persons, the dangers from the operation greatly diminished; and Mr. Moore probably over-estimates the deaths which would follow the operation under the most favourable circumstances when he says, that "after the last improvement in treatment "had been established, probably not more than one in two hundred were lost."†

"vice and immorality," and thinks men have good reason to be grateful for it as among "the wholesome severities ordained for offenders." Among the numerous objections subsequently raised against inoculation in France, especially by Monsier Hecquet, it was urged that it came from Turkey, and had been well received in a Protestant country.

* It is remarkable that, at the moment of introducing inoculation to England, this objection was mentioned as one which had currency in the East. Kennedy (op. cit. p. 155) says—"The greatest objection commonly proposed is, whether "or not it hinders the patient from being infected a second time." He adds, that in such cases of re-infection the second attack is "rarely or never in the "same manner, or the same fulness of malignity . . . it generally proves to "be that commonly called the bastard or hog-pox, which is empty or skinny, "and very little matter or malignity contained in it."

† History of Small-pox, p. 302. De la Condamine says (p. 20) that "out of "6,398 persons inoculated in England, but 17 are suspected to have died of the "consequences of the operation, which is only one in 376." Dr. Maty, the learned friend and translator of Condamine, remarks on this passage: "I can't "help thinking M. la Condamine's proportion full large, and I am inclined, after

The advantages of this alternative, as compared with that of encountering the risks of natural small-pox, were well set before the public by Dr. Jurin and Dr. Mead in England, by M. De la Condamine in France, and by others. The superstitions and prejudices respecting the practice were contended against by many able impartial persons. In 1746 an hospital was established for inoculating the poor, and for receiving them when affected with small-pox; and in 1754 the Royal College of Physicians of London pronounced its authoritative sanction of what was now no longer a speculative novelty.* Its advantages.

Many difficulties remained. "Inoculation," says Mr. Moore, "had become a very serious affair; for the preparatory "treatment lasted commonly a month, and medical attendance was requisite for five or six weeks longer; and, "though occasional disasters were palliated, they could not "be wholly concealed. Families in moderate circumstances "and timid mothers were not therefore very easily induced "to incur the expense and risk of such a process. Consequently, the practice of inoculation, though widely diffused, "was in a great measure confined to the opulent. .... It "appeared from a calculation made by Professor Monro in "1765, that between five and six thousand persons had been "inoculated in the whole of Scotland in thirty-one years, ... "and the fatal cases amounted to one in seventy-eight. "Nothing, therefore, could be more vain than the expectations of those who imagined that such a system could be "universally adopted." Its disadvantages.

Yet, subsequently, as improvements were made, under which its adoption implied far less cost of time, convenience, money, and life; and as the public became aware of these

a mature examination of all the facts that are come to my knowledge, to reduce it to that of one in a hundred." Among 5,964 individuals inoculated at the mall-pox Hospital in the years 1797–9, there were only nine deaths (Watson ii., 33). Gregory, loc. cit., p. 749, says: "the average number of deaths at the Inoculation Hospital was only three in a thousand." The National Vaccine oard (see Reports 1825 and 1837) speaks decidedly of "one in 300" as the roportion of the inoculated that "will surely die" from the operation,

* "Argumenta quæ contra hanc variolas inserendi consuetudinem in principio afferebantur, experientiam repellisse . . . . . eamque humano generi valde salutarem esse se existimare."—Taylor, Orat. Harv., 1855.

improvements, great impulse was given to the progress of inoculation; and this progress, as regards the masses of society, was made at least more rapid, if not more sure, by the competition of quacks, who promised for it a hundredfold what it could perform.

Its tendency to diffuse the infection of small-pox, and to cause an increased mortality.

But now at length it was that people began to see, in its full force, the one real and almost insuperable objection to variolous inoculation. For the inoculated themselves it was indeed an immense gain. By passing through the artificial disorder, they apparently became as safe against any recurrence of the infection as if they had suffered from it in the natural way; and they attained this result at a fiftieth part of the risk which would have attended the natural disease. They had no reason to complain.

But, meanwhile, what was the state of the remaining millions of the population of England? A principal point of improvement in the treatment of the inoculated was, wherever their strength allowed, to send them abroad into the open air; and as small-pox in its inoculated variety was not less infectious than in its natural form, the result may be imagined. Especially in the metropolis it could be observed; for here, under the influence of those doctrines which (so far as concerned the primary patients alone) made the chief improvements in treatment, inoculated persons were allowed to become incessant sources of general contagion. Even the Governors of the Small-pox Hospital (says Mr. Moore) broke through their original prudent regulations;* whoever applied at their gates were inoculated, and suffered to wander through the city of London covered with pustules and exhaling infectious vapour. The consequences of this system were, at the end of the century, admirably reviewed by Dr. Heberden, in a section of his well-known work;† and as this book is one of simple medical research, written with no controversial object, it will be well to consider his estimate of the case.

Dr. Heberden's estimate of this evil.

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* The Small-pox Hospital (says Dr. Williams, p. 199) was much too small to effect its object, since it could only receive fifteen persons at a time.

† On the Increase and Decrease of different Diseases, and particularly of the Plague. By Wm. Heberden, junr. 1801.

"The inoculation of the small-pox having been first used " in England since the beginning of the eighteenth century, " and having been now for many years generally adopted " by all the middle and higher orders of society, it becomes " an interesting inquiry to observe, from a review of the last " hundred years, what have been the effects of so great an " innovation upon the mortality occasioned by that disease. " But however beneficial inoculation prove to individuals, or " indeed to the nation at large, the Bills of Mortality incon- " testably shew, that in London more persons have died of " the small-pox since the introduction of that practice. The " poor, who have little care of preserving their lives beyond " the getting their daily bread, make a very large part of " mankind. Their prejudices are strong, and not easily " overcome by reason. Hence, while the inoculation of the " wealthy keeps up a perpetural source of infection, many " others, who either cannot afford or do not choose to adopt " the same method, are continually exposed to the distem- " per. And the danger is still increased by the inconsiderate " manner in which it has lately been the custom to send " into the open air persons in every stage of the disease, " without any regard to the safety of their neighbours. It " is by these means that, while inoculation may justly be " esteemed one of the greatest improvements ever introduced " into the medical art, it occasions many to fall a sacrifice " to what has obtained the distinction of the *natural* disease. " This must always be an objection against making any " great city the place for inoculation, until the practice is " become universal amongst all ranks of people. Out of " every thousand deaths in the Bills of Mortality, the num- " ber attributed to the small-pox during the first thirty " years of the eighteenth century, before inoculation could " yet have had any effect upon them, amounted to seventy- " four. During an equal number of years at the end of the " century, they amounted to ninety-five. So that, as far " as we are enabled to judge from hence, they would appear " to have increased in a proportion of above five to four."

Of the objections thus suggested to variolous inoculation— of the objections to it, at least, as a system for general

This objection almost insuperable.

adoption—I have ventured to say that they were almost insuperable. In theory, at first sight, it might seem otherwise. *If* all persons would but adopt that method, no one could suffer from another; the inoculated might then wander freely in fields and streets, or sit in theatres and omnibuses, finding no un-inoculated whom they could poison. But that *if* covers unattainable contingencies.

Putting aside for the moment all question of the strong and stupid prejudices against inoculation which still operated on multitudes of people; putting aside, also, the immoveable apathy and indifference of still larger numbers whom nothing will ever incite to precautions which look three days forward; putting aside, further, the reasonable fears entertained of an expedient under which two, or three, or four, or five, or ten in every thousand subjects were sure to die; and starting with an imaginary population neither prejudiced, nor apathetic, nor timorous, the inoculators themselves demurred against universal inoculation.* There were conditions of age and conditions of health, under which, even by them, it was thought unsafe to operate. Thus, even assuming an unanimous willingness of the world to adopt inoculation, there must inevitably remain against it this twofold objection:—first, that it would directly destroy a certain, though small, proportion of those submitted to its performance; and secondly, that to the very considerable number of persons, temporarily or permanently ineligible for the operation, it would occasion a greatly increased danger of contracting the natural disease.

State of the case sixty years ago.

And in practice (as may be inferred from Dr. Heberden's remarks) this objection was more fatal than in theory. Inoculation, despite its advantages to individual life, was becoming a serious evil to society. An admirable and till then unrivalled invention; it could only be worked at an intolerable cost of life.†

* See Dimsdale's Present Method of Inoculating for the Small-pox, 1779, pp. 9, 12, 13, 21; also De la Condamine, op. cit. pp. 17, 18, 45; also Mead, who implies the same sort of thing when he argues (op. cit. p. 344) that "the "venom is communicated to a young, healthy, and, for the age, strong body."

† From the commencement of inoculation this objection had been made to it on theoretical grounds, but had confused itself with the less reasonable arguments

Mr. Moore's estimate of the success of medicine against small-pox down to the end of the 18th century.

The historian of small-pox, looking back from this point of view on the labours which during twelve centuries had been made to mitigate its ravages, comes to a mournful conclusion on their value:—"The confession that must be made is "mortifying to a professional man, for, according to such "records as we possess, it appears that in spite of all medical "exertion, the mortality of small-pox had progressively "augmented. It has been made evident by calculations "from the Bills of Mortality of the City of London, "renowned for medical science, that at the beginning of "the eighteenth century about one fourteenth of the in-"habitants died of the small-pox, and during the last thirty "years of that century, when the practice in small-pox "was highly improved, the mortality by this disease had "augmented to one tenth....But this immense and in-"creasing consumption of human lives was not the sole "evil produced by this distemper; for a considerable por-"tion of the survivors were pitted and disfigured; some "lost one of their eyes, a few became totally blind, and "others had their constitution impaired, and predisposed "to a variety of complaints, which were productive of "future distress, and sometimes of death. These addi-"tional calamities cannot be reduced to calculation; but "as the mortality from small pox was continually on "the increase, these concomitant evils must have been so "likewise."*

Against the substantial justice of this painful criticism, so far as I am aware, no objection can be raised. Medicine baffled and helpless! For after times—for millions of our race—the continued raging of that pitiless plague. A drearier picture could scarcely have saddened mankind.

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of that period. In France its validity had been recognised; and after a severe epidemic small-pox, which prevailed in Paris in 1763, and was ascribed to an increased infection from the practice of inoculation, this practice was prohibited in the capital, so that (says Mr. Moore) "those who wished to be inoculated "were under the necessity of retiring to the country, where they might reap the "advantage of this operation, without destroying their neighbours." See also De la Condamine, op. cit.

* Moore's History of Small-pox, p. 299.

That this despair was not lasting is due to the genius of an English surgeon; and the close of the eighteenth century, which had much to darken it, will be remembered till the end of human history for the greatest physical good ever yet given by science to the world.

II.—The Early History of Vaccination.

Popular tradition on the efficacy of accidental cow-pox.

Among the dairy-folks of Gloucestershire there was a curious tradition, that a certain pustular eruption occasionally observed on the teats of cows, and supposed to be engendered in them by contagion from the grease of horses, might extend its infection to the human subject; and that persons who had suffered from this *Cow-Pox*, as it was called, were by it rendered insusceptible of small-pox.

Jenner.

Words to this effect were once spoken in the hearing of Edward Jenner, then a village doctor's apprentice in the neighbourhood of Bristol. They were never afterwards absent from his mind. Thirty years elapsed before their fruit was borne to the public; but incessantly he thought, and watched, and experimented on the subject; and the work in which at length he recorded the incomparable results of his labour may well have commanded the confidence of reflecting persons.

His first publication.

Little would ever be heard of objections to vaccination, if all who undertake the responsibility of its performance, and all who feel disposed to resist its adoption, would but thoroughly study that masterpiece of medical induction, and imitate the patience and caution and modesty with which Jenner laid the foundations of every statement he advanced.

The protective influence of cow-pox established;

In the first *Inquiry into the Causes and Effects of the Variolæ Vaccinæ* (1798) Jenner set on a scientific basis the popular belief to which I have referred. He cited in detail many instances of persons who, having at earlier periods of life accidentally contracted an infection from cows or horses, had afterwards shown themselves insusceptible of human small-pox;—instances, where the protective contagion had reached the hands of milkwomen, stable-boys, and the like;

where, for twenty, thirty, even fifty years afterwards, its consequences had survived; where the system, even at these distances of time, remained absolutely proof against all attempts to infect it with small-pox, either by inoculation or by the breathing of an infected atmosphere. He further showed by experiment (Case 19) that persons desirous of acquiring this protective influence needed not wait for some accidental infection; they could imitate the manœuvre of small-pox inoculation, and, on any occasion when the cattle of the neighbourhood might be suffering, could let the vaccine infection be surgically transferred to themselves from the cow.

and its inoculability from the cow.

If this had been the limit of Jenner's discovery he would, indeed, have made an interesting contribution to pathological science. For the popular belief which first excited his mind was by no means generally or firmly established, even in the counties where it originated. There were plenty of alleged instances, where cow-pox had failed to afford the imputed protection. The subject was obscured by many sources of fallacy; and nothing less than elaborate and skilful inquiry could have effected the important demonstration.

Necessity for this demonstration.

Up to this limit, however, his merits—though very great and original—were not exclusive. No one else, indeed, had come to the subject with the insight of genius; no one else had surmised what immense human interests were involved in that gossip of cowhouses; no one else had seen through the fallacies which made it contradictory and incredible. Still the tradition which had so moved him was not special to his one neighbourhood.* Common (as afterwards appeared) to sundry cow-keeping districts, it had floated past many other ears than Jenner's, and as early as 1769 had been paragraphed in a Göttingen newspaper. In parts of Holstein,

Partial anticipations of Jenner's practice.

* [That it had prevailed also in our county of Buckingham is stated in an interesting little handbill which I have lately read, issued in 1806 by a then curate of Leckhampstead and Akeley, the Rev. J. T. A. Reed, who mentions that in 1800, when he sought to introduce Jenner's operation among the people of his neighbourhood, they were very generally ready to accept it, and, in doing so, commonly told him—"We all know nobody ever died of the cowpock, and we all know that nobody ever had the small-pox after it, but what an odd thing that anybody should think of inoculating with it."—J. S., 1887.]

too, the protective influence of cow-pox had been so thoroughly recognised that, on more than one occasion, its infection had been artificially conveyed to the human subject; and especially Plett, a village schoolmaster, near Kiel, had thus in 1791, inoculated from the cow three children who, three years afterwards, when small-pox prevailed severely in their family, were found to be proof against infection.*

Propagability of cow-pox from person to person.

But this was not the limit of Jenner's achievement. Happily for mankind, his thoughts had from the first stretched further forward in the subject; and it was his transcendent merit to show how that apparently local privilege of the Gloucestershire cowherds might be diffused for the blessing of nations. When (in March, 1780) he first disclosed to an intimate friend the magnitude of what was in his mind, and communicated the theory he had formed on the protective influence of vaccine lymph, he "declared his "full and perfect confidence that it might be continued in "perpetuity by inoculation from one human being to another "in the same way that the small-pox was." And now, in his first publication, he announced what, for practical purposes, may be regarded as the fulfilment of that prediction. In a succession of cases he had conducted the lymph to a fifth generation from its source; and the child vaccinated last in the series had been proved by the test of variolous inoculation, to be no less safe against small-pox than another to whom had been given a first infection from the cow.

Setting aside for the present the question whether this transmission of the vaccine influence from person to person can really and practically be "continued in perpetuity," it may be sufficient to observe, that (1) its transmissibility through at least many successive human bodies, and (2) the large multiplication of lymph which, by the production of new vesicles, occurs at each stage of such transmission, were established fully and solely by Jenner's researches. These

* I borrow this statement from an interesting Lecture by Prof. Hasse, entitled "*Die Menschenblattern und die Kuhpockenimpfung*," Leipzic, 1852: who refers for it to Choulant's *Life of Jenner*. In Mr. Cline's note-book referred to below (p. xiii., foot-note) I find an entry, apparently made in 1780, that "some "enquiries and experiments ought to be made relative to the cow-pox."

are the all-important conditions, under which alone the discovered virtues of cow-pox could be useful for public protection.

Sources of fallacy to be guarded against.

Jenner had now detailed twenty-three cases in which, by vaccination, accidental or experimental, the human system had been rendered, for periods ranging up to 53 years, insusceptible of small-pox inoculation. He had reasonably accounted to himself for the so-called exceptions in the great pathological law which his cases illustrate; exceptions only in appearance; but which had precluded that law from early and general recognition. He had learned that not every eruption on the cow is the specific cow-pox; and that —even from cow-pox—not all inoculation is protective. The disease might be mistaken, or the lymph be spoilt. He had cautioned persons who would repeat his experiments against these sources of fallacy, "lest the want of discrimi-" nation should occasion an idea of security which might " prove delusive."

Barring such sources of fallacy, he asserted "that the " cow-pox protects the human constitution from the in-" fection of small-pox;" and that, by an appropriate procedure—henceforth to be named VACCINATION, this protective influence may be indefinitely communicated and multiplied among mankind.

VACCINATION.

Its first performance in London.*

These conclusions were at once accepted, as proven or probable, by persons of judgment and authority in the medical profession. Mr. Cline, then the great teacher of surgery at St. Thomas's Hospital, was, at Jenner's request, the first to verify them by experiment*; and early in 1799 Dr. Woodville, of the Small-pox Hospital, with the co-operation of Mr. Pearson, commenced a great series of public vaccinations in London.

* Both in Rose's Biographical Dictionary (art. Jenner) and in Gregory's Lectures on the Eruptive Fevers (p. 187) I read that the first verification of Jenner's discovery was made in *St. Thomas's Hospital*. As an alumnus of that school, I have wished to make sure of that statement; but neither in Mr. Cline's private case-book, in which his first vaccination is described, nor in Jenner's notice of the experiment (op. cit. p. 128), can I find any mention of the *place* where it was performed; and the name of the patient (Richard Weller) is not to be found in the hospital-register of the period.

Universal corroboration of Jenner's statements.

In these early days of the discovery, almost every case of vaccination was made a test of the alleged protection. Dr. Jenner, writing in 1801, says, "upwards of 6,000 persons "have now been inoculated with the virus of cow-pox, and "the far greater part of them have since been inoculated "with that of small-pox, and exposed to its infection in "every rational way that could be devised, without effect;" and Dr. Woodville (giving public evidence in 1802) said that, within two years (1799–1801) there were vaccinated at the Small-pox Hospital 7,500 persons, of whom about one half were subsequently inoculated with small-pox matter, and in none of them did small-pox produce any effect. Other observers, too, had contributed numerous instances of persons who, having accidentally contracted infection from the cow, were found, many years afterwards, capable of resisting all attempts to infect them by inoculation of small-pox.

Conclusiveness of these facts;

These facts told their own story, and they tell it still. They were in themselves sufficient argument; for Jenner's simple truthful style carried conviction. No one candidly studying them (in the first publication and in its supplements of the next two years) could, even at that time, reasonably doubt that, *subject to certain qualifications*, there was now given to society an almost absolute power to control the ravages of small-pox.

under certain qualifications.

Subject, I say, to certain qualifications; for it was not yet proved or tested that infants vaccinated by Jenner's process would permanently enjoy the same complete protection which he had shown to exist in persons who at riper age had contracted accidental cow-pox by their own manipulation of infected cattle; neither was it beyond question whether perhaps the vaccine influence might become progressively though slowly enfeebled by an indefinite length of human transmission. Time, and long time alone, would decide whether these would be over-fastidious doubts; but if, indeed, Jenner did undervalue their remote interest (almost invisible clouds, as they were, in the distance) it may, at least, be said that envy and malice have found no other weakness in his case.

Scientific meaning of cow-pox.

It was not till forty years afterwards that science supplied an authentic interpretation of Jenner's wonderful discovery. He, indeed, had suspected the solution, and had hinted his meaning when he called cow-pox by the name of *variolæ vaccinæ*:—for such, in fact, it is—*the small pox of the cow.* It had been an old medical observation that cattle often suffered in the same epidemic with men; certain of their diseases had already (especially by Dr. Layard, in the Philosophical Transactions for 1780) been compared to the human small-pox; and Jenner (says his biographer) "always "considered small-pox and cow-pox as modifications of the "same distemper, so that in employing vaccine lymph we "only make use of means to impregnate the constitution "with the disease in its mildest, instead of propagating it "in its virulent and contagious form, as is done when small-"pox is inoculated."* Researches subsequent to Jenner's, and extending to within the last twenty years, have settled this part of the question.† It has been made matter of almost familiar experiment that the infection of small-pox may, by inoculation, be communicated from man to the cow; that its result is an eruption of vesicles presenting the physical characters of cow-pox; that the lymph from these vesicles, if implanted in the skin of the human subject, produces the ordinary local phenomena of vaccination; that the person so vaccinated diffuses no atmospheric infection; that the lymph generated by him may be transferred, with reproductive powers, to other unprotected persons; and that, on the conclusion of this artificial disorder, neither renewed vaccination, nor inoculation with small-pox, nor the closest contact and cohabitation with small-pox patients, will occasion him to betray any remnant of susceptibility to infection.

Recent researches: their results, and authors.

The merit of first putting on record these important facts does not belong to England. As early as 1801, Dr. Gassner of Günzburg—after ten unsuccessful trials of small-pox inoculation on cows—had at last succeeded in infecting one;

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* Much interesting historical information on these points is compiled by Dr. Baron in his fifth chapter, vol. i., p. 162.

† *See Note* II., p. 305: Vaccinia as a modification of Small-pox.

and, with matter taken from the resulting vesicles of this animal, had inoculated four children; who thereupon had developed the ordinary phenomena of vaccination, furnishing vesicles from the lymph of which seventeen other children had been similarly infected. Dr. Gassner's discovery remained for forty years almost entirely unknown or unbelieved; but at length Dr. Thiele, of Kasan, repeated the experiment with equal success, and rendered it still more complete by supplying a necessary test of the nature of the process. He shewed, namely, that the lymph engendered in these experiments possessed, not only the local infectiousness, but likewise the protective powers of cow-pox; that persons recently inoculated with it might with impunity be let sleep in one bed with small-pox patients, or be inoculated with small-pox virus; that, in short, it was true, protective, vaccination which they had undergone. The result of these investigations was not published before the beginning of 1839;* at which time other experiments of the same kind, independent and equally conclusive, were being conducted in this country by Mr. Ceely, of Aylesbury; of whom I am glad to repeat the praise awarded him by the high authority of Dr. Robert Williams, that he "has done "more to advance the natural history of vaccination than "any other individual since the days of Jenner." Soon afterwards—and also by independent experiments—Mr. Badcock, a long established druggist of Brighton, arrived at the same conclusion as to the origin of cow-pox: and from 1840 to the present time he has constantly been applying his knowledge to its important practical purpose; having within this period again and again derived fresh stocks of vaccine lymph from cows artificially infected by him; having vaccinated with such lymph more than 14,000 persons; and having furnished supplies of it to more than 400 medical practitioners.

Theoretical interest of these observations.

These researches are mentioned out of their chronological order, because they set in so very clear a light the meaning of Jenner's practice. A host of theoretical objections to

* *See Note* II., p. 305 : Vaccinia as a modification of Small-pox.

vaccination might have been met, or indeed anticipated, if it could have been affirmed sixty years ago as it can be affirmed now:—"This new process of preventing small-pox is really "only carrying people through small-pox in a modified form. "The vaccinated are safe against small-pox, because they in "fact have had it. Their safety is of the same sort as if they "had been inoculated under the old process, or had been "infected by the natural disease. The trifling disorder which "they suffer—these few tender vesicles on the arm, this "slight feverishness that they shew—is small-pox of the "most mitigated kind; small-pox so modified by the inter-"mediate animal organization through which it has passed, "that, when thus re-introduced to the human body, it excites "but insignificant disturbance, and no general exhalation of "infective material."

The subject of vaccination first brought before Parliament.

Returning now to the early history of vaccination, we find that early in 1802 the subject was formally brought under cognizance of the Legislature. By this date Dr. Jenner's "correspondence had become so extensive as to occupy "almost all his time, and to make him a most laborious "servant of the public for their great and exclusive benefit, "whilst there was nothing of advantage left to himself but "the consciousness that he was so employed; and, under "these circumstances, it was thought that the magnitude of "his discovery and the very disinterested manner in which "he was sacrificing his time and his property in diffusing its "blessings, were fit subjects for the consideration of the "British Parliament."* On presentation of a petition to this effect, Mr. Addington, then Prime Minister, informed the House of Commons that he had taken the King's pleasure thereon, who strongly recommended it to the consideration of Parliament.

First Parliamentary Committee.

The Committee to which the petition was referred, "after "examining a number of witnesses of the highest character "and most extensive experience in the profession," reported in full corroboration of all that Jenner had alleged.

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* Baron's Life of Jenner, p. 480.

Subjoined to this Letter is the evidence (App. A.) which Jenner gave before that Committee, and likewise (App. B.) the Committee's Report.*

Its Report.

Admiral Berkeley, the chairman of the Committee, in the speech with which he introduced the Report, made a statement which greatly added to its significance. "In the inves-
" tigation of a matter so important to mankind in general,
" it was not thought right by the Committee to confine their
" examination to the petitioner's evidence alone, as is usually
" the case, but to sift out any case which could make against
" it. This conduct, which certainly may appear to bear hard
" on the petitioner, has proved a matter of fresh triumph to
" him; for although we descended to sift out information
" from every anonymous letter—though we raked the very
" kennels for information against this practice—all that we
" were enabled to get is pointed out at full length in the
" Report; and such were the explanations on those very
" cases—such were the testimonies against that evidence—
" that if Dr. Jenner's discovery could receive additional lustre
" from this sort of inquiry, it certainly has done so. Upon
" the beneficial effects of this discovery I hardly wish to
" trouble the Committee (of Supply) as I am certain, if the
" Report, which contains the scientific opinion of the first
" medical men in this country, does not satisfy the House,
" the united opinion of all the world, the homage of Europe,
" which has been paid to the discoverer of this blessing, will
" have its due weight on the minds of his countrymen."

First Jennerian Institution.

The verdict was not without its effect. At the close of this year steps were taken, with unprecedented strength of public support, to found by voluntary contributions a society " for the extermination of small-pox;" and on the 3rd of February, 1803, the great discoverer took his seat for the first time as President of the Royal Jennerian Institution. This society, "fostered by the most exalted patronage, and

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* The Evidence at large, as laid before the House of Commons, respecting Dr. Jenner's Discovery of Vaccine Inoculation, together with the Debate which followed, and some Observations on the contravening Evidence, &c.; by the Rev. G. C. Jenner, 1805.

" adorned by all the learning and talent of the medical pro-
" fession of the metropolis," took a very important part in diffusing the first advantages of vaccination. "Thirteen
" stations were opened in different parts of the metropolis.
" In eighteen months they were enabled to announce that
" 12,288 inoculations had taken place, and during the same
" space of time 19,352 charges of vaccine virus were supplied
" from the central house to most parts of the British empire,
" and to foreign countries..... This society was also in
" correspondence with other institutions, and its medical
" council investigated with care and fidelity such cases of
" small-pox as were alleged to have occurred after vacci-
" nation."

Early prejudices against vaccination; compared with former prejudices against inoculation of small-pox.

It would have been claiming too much from reason, to expect that this progress could be made without opposition. Eighty years earlier the use of variolous inoculation—a thing of immemorial practice in eastern countries—could not be imported here by those who had witnessed its operation on thousands, without its introduction exciting theoretical (as well as rightly founded practical) objections. How much less, then, could Jenner find an easy reception for his method! It appealed to no national experience. It based itself only on some rustic traditions, and on his few thoughtful observations.

Prognostics,

Great allowance must indeed be made for those who then hesitated to accept this wonderful novelty. The very magnitude of the promised boon almost justified mistrust. And—to persons ignorant of the Gloucestershire experience—that good should accrue from such a source was a strange supposition. Fears were more suggested than hopes.* What could be expected from "a bestial humour" but new and dreadful diseases? Who could see the limit of its "consequences," physical or moral? What security was there against "horns" growing on the vaccinated? What "ideas might arise in the

* See especially "Treatise on Lues Bovilla, or Cow-pox" (3 editions) "Commentaries on Lues Bovilla, or Cow-pox" (3 editions) and "Cow-pox Epistle to Rowland Hill" (7 editions) all by B. Moseley, M.D., Member of the Royal College of Physicians of London, and of the University of Leyden; likewise other works mentioned below.

" course of time from a brutal fever having excited its incon-
" gruous impressions" on the brain? Who knew but that
" the human character might undergo strange mutations from
" quadrupedan sympathy, and some modern Pasiphae rival
" the fables of old?"

and denunciations,

While these physiological conjectures were gravely pressed upon the public, religion and morality were not less misargued to the same effect.* Leviticus was quoted, with dark insinuations against "contaminating the form of the Creator
" with the brute creation." Small-pox being a "merciful
" provision on the part of Providence to lessen the burthen
" of a poor man's family," was it not "impious and profane
" to wrest out of the hands of the Almighty these divine
" dispensations?" What could ensue, on so daring a measure of attempted prevention, but some unimagined punishment?

Reply to these various scruples (where they were sincere) was no difficult matter. Those who feared mysterious bodily changes were answered from the collection of observed facts and experiments; were assured that, in Berkeley, neither horns had grown nor Minotaurs been begotten. To the others—superstitious mistrusters of good—it seemed enough to say that, in this beneficent economy of the world, antidotes are ever scattered side by side with poisons; that not exclusively the latter are of divine gift; that man's duty concurs with his instinct and privilege, to struggle against physical as against moral evil.

and inventions.

Up to a certain point, the weaker side in a controversy is apt to grow noisier with defeat. In proportion as Jenner's merit became recognised by Parliament and the public, those who had committed themselves to opposition became more and more vehement against his matchless discovery. All that

* "Cow-pox Inoculation no Security against the Small-pox Infection," by W. Rowley, M.D., Member of the University of Oxford, and of the Roy. Coll. Physicians; "Serious Reasons for uniformly objecting to the Practice of
" Vaccination," by John Birch, Surgeon to St. Thomas's Hospital. Over Mr. Birch's remains, within one of the City churches (Rood Lane), a monument erected by his sister commemorates, that "the Practice of Cow-poxing, which first became general in his day, Undaunted by the overwhelming influence of power and prejudice, And the voice of Nations, He uniformly and until Death (1815) perseveringly opposed."

had been predicted was now, they said, in fulfilment. The nation, unconsciously, was dying of vaccination. Terrible portents were described.* A child at Peckham had its former natural disposition absolutely changed to the brutal, so that it ran upon all fours like a beast, bellowing like a cow, and butting with its head like a bull! Sarah Burley's face was distorted, and began to resemble that of an ox! Master Joules, similarly degenerating, became the ox-faced boy—a proverb and a frontispiece! A lady's daughter coughed like a cow, and had grown hairy all over her body! William Ince, too, had grown patches of hair not resembling his own, but of the same colour, length, and quality as that of a cow! Many had suffered like him! Some also squinted as only oxen can squint! Others had lost their nails and the ends of their fingers! Eruptions, ulcers, mange, abscesses, scabs and blotches, glandular tumours and diseased joints and decaying bones, fevers and blindness, and gangrene and convulsions, were multiplying among the victims of Jenner! Deaths, as every one could see, were plentiful. And on what but vaccination could they depend? It was the old story again:—

Post ignem æthereâ domo
Subductum, macies et nova febrium
Terris incubuit cohors;
Semotique prius tarda necessitas
Lethi corripuit gradum.

Such was the experience of the opposition. Divested of its more ludicrous imaginations, and some allowance being made for an occasional unskilfulness of those who pretended to vaccinate, all resolves itself into the one not uncommon error, of confounding what is fact with what is opinion or inference. Facts.

* "Dissertation on the Failure and Mischief of Cow-pox," and "Cow-pox exploded," both by G. Lipscomb, Surgeon; "Observations on the Pernicious Consequences of Cow-pox Inoculation" (3 editions) by R. Squirrell, M.D. The last-named author certainly did his utmost to produce the results which he predicted. Not content with being struck "with such horror and aversion that he could not as a man of honour or feeling submit to or coincide with vaccination," he recommended those who had already undergone the operation immediately to submit themselves to a course of treatment to "eradicate every particle of the cow-pox virus out of the blood." His treatment was mercury. The consequences may be imagined. See also (contra) "Letters to Dr. Rowley on his late Pamphlet" (with a frontispiece) by Aculeus; "The Vaccine Contest," by William Blair; and "Treatise on Cow-pox," by John Ring.

A child coughed: to the ears of the vaccinophobist, the sound was as of a cow; to his intellect, it was the effect of vaccination. A child was ugly or squinting, or it had those skin eruptions which have always been frequent incidents of infancy: at once, to the alarmist, there was *vultus taurinus* or *tinea bovilla*. In a word, the oldest and most familiar diseases were thus re-named, in conformity with a belief that vaccination was causing them; while, in reality, there was no more reason in this belief, than if vaccination had been charged with occasioning infants to cut their teeth, or with leading boys to prefer cricket to Cornelius Nepos.

Last appeals.

As the chances of the opposition became less hopeful, so did their language grow worse and their arguments more wild.* Placards and caricatures were resorted to. Tender points were aimed at. Were persons about to marry—might not vaccination injure their fortune in life? Might there not be a disclosure of shocking facts? And was nothing due to patriotism? Evil and Buonaparte (1807) and Vaccination are allowed to triumph for a time, perhaps as the scourge and punishment of our sins:—but shall we submit because they have for awhile been prosperous? No! Britons never, never, &c.

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* Rowley, op. cit.; also F. Smyth Stuart's "Letter on the Subject of Coercive "Vaccination," and "£30,000 for the Cow-pox." To this author's fancy vaccination was "a mighty and horrible monster with the horns of a bull, the "hind hoofs of a horse, the jaws of the kraken, the teeth and claws of a tyger, the "tail of a cow, all the evils of Pandora's box in his belly; plague, pestilence, "leprosy, purple blotches, fœtid ulcers, and filthy running sores covering his "body, and an atmosphere of accumulated disease, pain and death around him "which had made its appearance in the world and was devouring mankind—"especially poor helpless infants, not by scores only or hundreds or thousands, "but by hundreds of thousands." The author assists his description by an engraved caricature:—Dr. Jenner and other ministers of vaccination (distinguished from ordinary practitioners of medicine by the addition of cowtails and horns) are discharging large hampers of children into the mouth of the monster; while another (apparently Dr. Thornton) officiates behind with a spade, and shovels into a nightman's cart the undigested remains of this diet. From the distance are advancing to the rescue Drs. Moseley, Squirrel, and Rowley, with Messrs. Birch and Lipscombe, "the men, the heroes," to whom also an obelisk is erected in the right background. Perhaps it may have been in this unattractive guise that vaccination was first introduced to Philadelphia, where (see Baron's Life of Jenner, vol. i. p. 442) "the leading physician pronounces it too beastly "and indelicate for polished society."

You will find it difficult to believe that the very oldest of this nonsense, which I have transcribed, was written in England within sixty years of the present time. By us, for half a century, it has been forgotten; or only recalled as an echo by occasional last words from the continent, where, far off, there is seen sometimes a feeble wave still rippling from that old flood of ours. It is wearisome work to read stuff so stupid or so dishonest. But I have ventured to trouble you with it, as with some other parts of this narrative, in order that it may plainly be seen how little of suddenness or surprise there was in the first social successes of vaccination; how everything possible and impossible was affirmed against it; how all weaknesses and prejudices were appealed to; how every inch of progress was contested; and how little it can be said that Jenner stole a march on the public mind. Further—because there is nothing new under the sun, and the wheel of time brings back the follies of the past oftener than its wisdom, it may become necessary, in case these doctrines should emerge again from obscurity, to refer to their right authors the praises of original invention, and to remember that fifty years ago such objections were examined and refuted and condemned.

Present interest in this obsolete literature.

For, when those outcries were raised, the public naturally hesitated, and asked for explanation. Moseley and Squirrell and Rowley and Birch and Lipscombe and even Stuart were, no less than Jenner, members of the medical profession. To the uninitiated, it was Doctor against Doctor.

Public doubts.

Under these circumstances two inquiries were successively instituted.

First in 1805, "the medical council of the (then) Royal "Jennerian Institution, having been informed that various "cases had occurred which excited prejudices against vaccine "inoculation, and tended to check the progress of that im-"portant discovery in the kingdom, appointed a committee "of twenty-five of their members to inquire into the nature "and truth of such cases." The Report in which the council recorded the result of this inquiry, contains much which is as applicable to the present occasion as to the circumstances of that time. I therefore subjoin it (App. C.) for your con-

Report of Royal Jennerian Institution.

sideration; begging merely to observe, that among the members of this council and committee were not only surgeons and physicians of the largest practice and highest character in London, but especially some whom the profession of that day would have selected as the most competent persons in England to pronounce on the questions at issue. You will observe that minute inquiry was made, not only into allegations then current against the protective powers of vaccination, but also into "opinions and assertions which "charged the cow-pox with rendering patients liable to "particular diseases;" and that the council, after having detailed the results of this inquiry, "cannot conclude their "report upon a subject so highly important and interesting "to all classes of the community, without making this solemn "Declaration:—

"That in their opinion, founded on their own individual "experience, and the information which they have been "able to collect from others, mankind have already derived "great and incalculable benefit from the discovery of vac-"cination: and it is their full belief, that the sanguine "expectations of advantage, and security, which have been "formed from the inoculation of the cow-pox will be ulti-"mately and completely fulfilled."

Discussion in Parliament.

The second inquiry was even more critical. The then Chancellor of the Exchequer, (now Lord Lansdowne) asked the attention of the House of Commons (July 2, 1806) "to "a subject of general importance.... totally unconnected, "indeed, with all party principles.... but concerning the "welfare, health, and existence of a large portion of His "Majesty's subjects, and therefore well deserving of the "consideration and support of Parliament;.... that very "remarkable discovery.... a substitute for the loathsome "small-pox, an evil which has spread a dreadful desolation "throughout the whole world. He stated to the House "facts, derived from the experience of vaccination in (alas!) "other countries than England, illustrative of those advan-"tages to society which we were neglecting to realise. He "expressed a profound regret, that in this country alone, "in which the discovery had originated, the salutary practice

" of vaccine inoculation had been undergoing a retrograde " movement. He referred to the objections and to the " manner in which they had been promulgated; to pre- " judices which had been excited, and to their fatal effect " in bringing back nearly that average degree of depopu- " lation which had been experienced previous to the intro- " duction of the vaccine discovery. He had not the smallest " inclination to propose any compulsory measures, ... but " felt it a duty incumbent on him .... to submit a plan " by which the House should become possessed of a mass " of evidence as to the real merits of this discovery; .... " a procedure which would tend to enlighten the public, " by informing them in a formal and regular manner of " what appeared to be the truth, ... and would give this " valuable discovery the advantage of having all the weight " of promulgation which the high character and popularity " of Parliament is capable of. He concluded by moving that " an humble address be presented to His Majesty, praying " that he will be graciously pleased to direct His Royal " College of Physicians to inquire into the state of the " vaccine inoculation in the United Kingdom, and to report " their opinion as to the progress which it has made, and " the causes which have retarded its general adoption." Mr. Wilberforce (from the other side of the House) and Mr. Windham (then Secretary of State) with others, spoke at length and with great earnestness, in the same general sense as Lord Henry Petty; so the motion passed *nem. con.*

Report of Royal College of Physicians.

Nine months passed before the College of Physicians (April 1807) made its Report:—" Deeply impressed with " the importance of an inquiry which equally involves the " lives of individuals and the public prosperity, they had " made every exertion to investigate the subject fully and " impartially: In aid of the knowledge and experience of " the members of their own body, they had applied sepa- " rately to each of the Licentiates of the College; they had " corresponded with the College of Physicians of Dublin " and Edinburgh; with the College of Surgeons of London, " Edinburgh, and Dublin; they had called upon the Societies " established for vaccination for an account of their practice,

" to what extent it had been carried on, and what had been " the result of their experience; and they had by public " notice invited individuals to contribute whatever infor- " mation they had severally collected."

An inquiry of this nature and extent, conducted under a sufficient sense of responsibility by the first medical corporation of the kingdom, could not fail to deserve public confidence. Nearly every passage in the Report applies to the present juncture, as well as to the purpose for which it was written; and I subjoin the whole of it (Appendix D.) as recording by far the most important investigation to which Jenner's discovery has been submitted in the country of its birth. Having already quoted the words with which the Report opens, I will here also repeat the remarkable paragraphs which close it:—

" The College of Physicians feel it their duty strongly to " recommend the practice of vaccination. They have been " led to this conclusion by no preconceived opinion, but by " the most unbiassed judgment, formed from an irresistible " weight of evidence which has been laid before them. For, " when the number, the respectability, the disinterestedness, " and the extensive experience of its advocates is compared " with the feeble and imperfect testimonies of its few " opposers; and when it is considered that many, who were " once adverse to vaccination, have been convinced by " further trials, and are now to be ranked among its warmest " supporters, the truth seems to be established as firmly as " the nature of such a question admits; so that the College " of Physicians conceive that the public may reasonably look " forward with some degree of hope to the time when all " opposition shall cease, and the general concurrence of man- " kind shall at length be able to put an end to the ravages at " least, if not to the existence, of the small-pox.

The discussion exhausted.

With this Report terminates, for all practical purposes, the early history of vaccination in England. The result was of course brought (July 29, 1807) under notice of the House of Commons; and again, in such a debate as is seldom given to matters of concord, the foremost members of the House honoured themselves by honouring the great benefactor of

mankind. Henceforth, the public mind was apparently quite satisfied on the subject ;* and from this period, I repeat, begins to date the almost universal vaccination of children of the educated classes in this country.

General assent of the medical profession.

The general assent of the Medical Profession dated from an earlier period, and soon became all but unanimous. An infinitely small amount of *bonâ fide* dissent probably continued ; in reference to which I will only observe, that allowance must be made for two sorts of personal influence which tended, and perhaps still tend to occasion it.

Individual exceptions.

Even now among the living contemporaries of Jenner's discovery, there must be men whose fathers and friends and teachers of fifty years back denounced the new practice. Among such as remember the warmth of that contest, perhaps not all discriminate the error. The old allegiance of studentship binds, possibly, here and there a surviving follower of Birch. An hereditary admirer of small-pox inoculation, he may remember only its advantages as compared with the evils of natural small-pox; may forget the fatal objections to its general employment, and may still hesitate to replace that practice of his youth by the "speculative " novelty " of vaccination.

Also to a very small extent allowance must be made for personal eccentricities, which—in respect of vaccination, as of every other subject—have ever caused solitary voices to be raised against the common convictions of mankind. This influence can scarcely cease to operate. Occasionally, no doubt, till the end of time there will be found some lover of paradox, ready, in mere wantonness of authorship, to choose his text from Squirrell or Rowley, and to write dispraise of Jenner, as Cardan wrote his encomium on Nero.

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* There always has been, and there always must be a kind of opposition to which my text does not refer, and against which it would be ridiculous to argue. What has sounded like a voice of dissent has sometimes been only the jingle of an advertising cart. What has looked like a conflict of opinion has sometimes been the mere hustling of pickpockets in the crowd. For quacks with their touters have often found it convenient to hitch themselves on to the skirts of a discussion in which the public has been interested; ready for any chance of reviling the science which condemns their wretched arts ; but above all, eager to assure their dupes that, while vaccination is so worthless a precaution, life may be prolonged and youth made perpetual by one incomparable pill or elixir.

Subject only to these qualifications, it may be said, as regards England, that the convictions of the medical profession on this important matter were fixed fifty years ago. Even then, probably, they would have been expressed with the same sort of unanimity as prevails among the professors of any other department of knowledge, in respect of their most familiar and elementary teaching.

Whether my present inquiry has brought to light any subsequent divergence of opinion, is a question on which the evidence (App. E. to K.) is before you, and to which I shall presently return.

III.—Small-pox since the Use of Vaccination.

Evidence on the protectiveness of vaccination must now be statistical.

In the earlier days of Jenner's discovery the evidence which led men to adopt vaccination depended on a somewhat minute inquiry into individual cases. In thousands of instances (as I have already mentioned) the patient after being vaccinated, was deliberately tested by inoculation with small-pox matter; in other instances, chance supplied equivalent means of trial; and the results of these very numerous experiments were sufficiently uniform to convince the public judgment.

At present it may be reasonably claimed that the evidence shall be of a more comprehensive kind. From individual cases the appeal is to masses of national experience. Tested by half a century's trial on the millions of civilized Europe, what has vaccination achieved? Comparing the small-pox mortality of the last forty or fifty years with that of as many years in the last century, do we find a sensible difference? Has progress been made towards that final result which (App. A.) Jenner anticipated,—the annihilation of the most dreadful scourge of the human species?

Foreign information obtained by the Epidemiological Society.

In respect of certain countries, these questions are admirably answered in papers already before Parliament. Four or five years ago the Epidemiological Society of London appointed a committee of its members to conduct inquiries connected with small-pox and vaccination. The committee,

having obtained from foreign governments the communication of most important statistical facts as to the decline of small-pox, reported (inter alia) these results to the Society; and soon afterwards this valuable report, specially the work, I believe, of Dr. Seaton, honorary secretary to the committee, was ordered to be printed for presentation to both Houses of Parliament.

For reasons with which I need not trouble you, I neither quote at length the statistical tables of that Report, nor exactly follow their form; but, extracting from the foreign communications of its Appendix such particulars only as relate to population and small-pox, and distinguishing these into two periods, I obtain all requisite means for comparing the past and present ravages of the disease. On this plan the following table has been constructed; and in observing the last columns (calculated by Mr. Haile from the materials referred to) you will notice, side by side two series of facts:—1st, how many persons in each million of population annually died of small-pox before the use of vaccination; and 2ndly, how many persons in each million of population have annually died of small-pox since the use of vaccination. And lest these facts should appear a whit stronger or less strong than they really are, I have set in the other side of the table, opposite the name of each territory, a statement of what periods of time are referred to in the particular comparison.

Its results in tabular form.

The results are truly conclusive.

Compare, for instance, in the case of Sweden, the twenty-eight years before vaccination* with forty years soon afterwards:—during the earlier period there used to die of small-pox, out of each million of the Swedish population, 2,050

Contrast of periods before and after vaccination in Austria, Prussia, Sweden, and Copenhagen.

* The small-pox death-rate for this earlier period has been calculated from the numbers given in an important paper which we owe to the Swedish Board of Health. Before 1774, measles and small-pox were unfortunately not distinguished in the mortuary registers of the kingdom; so that the first section of the table must be read with allowance for this combination. During the period referred to in the text small-pox deaths were separately enumerated, and of course are alone counted in the estimate there given of the small-pox death-rates for 1774–1801 and 1810–50. The first successful vaccinations in Sweden were performed at the end of 1801, namely (in Malmö) November 23, and (in Stockholm) December 17. About 1810, the vaccinations were amounting to nearly a quarter of the number of births.

victims annually;—during the later period, out of each million of population, the small-pox deaths have annually averaged 158.

Or compare two periods in Westphalia: during the years 1776–80, the small-pox death-rate was 2,643: during the thirty-five years 1816–50, it was only 114.

Or taking together the three lines which belong to Bohemia, Moravia, and Austrian Silesia, you find that where formerly (1777–1806) there died 4,000, there now die 200.

Terms of Years respecting which Particulars are given.	Territory.	Approximate average Annual Death rate by Small-pox per Million of Living Population.	
		Before Introduction of Vaccination.	After Introduction of Vaccination.
1777–1806 and 1807–1850 -	Austria, Lower -	2,484	340
1777–1806 and 1807–1850 -	„ Upper & Salzburg	1,421	501
1777–1806 and 1807–1850 -	Styria - - -	1,052	446
1777–1806 and 1807–1850 -	Illyria - - -	518	244
1777–1806 and 1838–1850 -	Trieste - - -	14,046	182
1777–1803 and 1807–1850 -	Tyrol and Voralberg	911	170
1777–1806 and 1807–1850 -	Bohemia - - -	2,174	215
1777–1806 and 1807–1850 -	Moravia - - -	5,402	255
1777–1806 and 1807–1850 -	Silesia (Austrian) -	5,812	198
1777–1806 and 1807–1850 -	Gallicia - - -	1,194	676
1787–1806 and 1807–1850 -	Bukowina - -	3,527	516
1817–1850 -	Dalmatia - - -	—	86
1817–1850 -	Lombardy - -	—	87
1817–1850 -	Venice - - -	—	70
1831–1850 -	Military Frontier -	—	288
1776–1780 and 1810–1850 -	Prussia (East. Provs)	3,321	556
1780 and 1810–1850 -	Prussia (West. Provs)	2,272	356
1780 and 1816–1850 -	Posen - - -	1,911	743
1776–1780 and 1810–1850 -	Brandenburgh - -	2,181	181
1776–1780 and 1816–1850 -	Westphalia - -	2,643	114
1776–1780 and 1816–1850 -	Rhenish Provinces -	908	90
1781–1805 and 1810–1850 -	Berlin - - -	3,422	176
1776–1780 and 1816–1850 -	Saxony (Prussian) -	719	170
1780 and 1810–1850 -	Pomerania - -	1,774	130
1810–1850 -	Silesia (Prussian) -	—	310
1774–1801 and 1810–1850 -	Sweden - - -	2,050	158
1751–1800 and 1801–1850 -	Copenhagen - -	3,128	286

Or taking two metropolitan cities; you find that in Copenhagen, for the half century 1751–1800, the small-pox death-rate was 3,128, but for the next half century only 286; and still better in Berlin, where, for twenty-four years preceding the general use of vaccination, the small-pox death-rate had been 3,422, for forty years subsequently it has been only 176.

In other words, the fatality of small-pox in Copenhagen is but an eleventh of what it was; in Sweden little over a thirteenth; in Berlin and in large parts of Austria, but a twentieth; in Westphalia but a twenty-fifth. In the last-named instance, there now die of small-pox but four persons, where formerly there died a hundred.

Other national statistics are not sufficiently accurate for the purposes of an equally exact comparison.

From such information as exists it seems probable that the small-pox death-rate of London within the Bills of Mortality, during the eighteenth century, ranged from 3,000 to 5,000. During the ten years 1846–55, it was under 340.

Dr. Lettsom, in his evidence before the Parliamentary Committee of 1802, stated reasons for estimating the small-pox death-rate of England at about 3,000; and Dr. Blane's evidence was nearly to the same effect. Reference to the adjoining table (where the death-rates of other countries are given) and to subsequent tables (where the death-rate of London at different periods is minutely examined) leads me to believe that such an estimate by no means exaggerates our average losses before the discovery of vaccination. In contrast therewith I shall hereafter have occasion to show, that for the years 1841–53 the average small-pox death-rate of England and Wales was only 304; in 1854, only 149; in 1855, only 132.

Further exclusion of Small-pox in proportion as vaccination is general.

But even the later rates, reduced as they are, belong to a population of which some considerable section is unprotected; and it is easy to observe, that, in proportion as vaccination becomes more general among the given number of persons, so is the small-pox death-rate further lessened. Sufficient proofs are given by those public establishments—

army, navy, and schools—in which it is the rule to vaccinate on admission all unvaccinated subjects who do not show marks of previous small-pox. Thus, in an important paper, which I subjoin (App. E., reprinted from the *Transactions of the Medical and Chirurgical Society of London*) Dr. Balfour shows that the small-pox mortality of the British navy has not reached a third, nor that of the British army a fourth, of the London rate; and that in the experience of the Royal Military Asylum for 48 years (within which time 5,774 boys have been received for training) only four deaths by small-pox have occurred, and *these all in non-vaccinated boys* who were believed already to have suffered small-pox once before becoming inmates of the school. In two severe epidemics of small-pox which prevailed in Malta in the years 1830–1 and 1838–39, the death-rate of the general population was just twenty times the death-rate of the military population.* Other evidence of the same nature may be collected from materials in the Appendix, to which I shall hereafter more particularly refer.

A check.

It is a vast improvement which the above figures demonstrate. Yet, unequalled as have been already the benefits to mankind conferred by the discovery of vaccination, the gain would have been greater but for a disappointment, which I have now to mention.

Post-vaccinal small-pox.

In the early days of vaccination it was noticed that every now and then small-pox would attack a person said to have been vaccinated. Enemies used this fact with so much exaggeration and spiteful triumph that sober persons at first hardly gave it the attention it deserved. But though often vaunted in mere malice, it was in substance true, that vaccinated persons did not, even then, *invariably* resist small-pox. In the two reports (1806 and 1807) to which I have already referred, these exceptional failures were admitted in the following terms:—

Early illustrations.

First, (Rept. R. Jenn. Institution, seq. page 4):—

"That most of the cases which have been brought forward as "instances of the failure of vaccination to prevent the small-pox, "and which have been the subjects of public attention and conversa-

* Wunderlich's Handbuch der Pathologie u. Therapie, vol. iv. p. 207.

"tion, are either wholly unfounded or grossly misrepresented; that "many persons have been declared duly vaccinated, when the opera- "tion was performed in a very negligent and unskilful manner, and "when the inoculator did not afterwards see the patients, and there- "fore could not ascertain whether infection had taken place or not; "and that to this cause are certainly to be attributed many of the "cases adduced in proof of the inefficacy of the cow-pox: that some "cases have been brought before the Committee on which they could "form no decisive opinion, from the want of necessary information as "to the regularity of the preceding vaccination, or the reality of the "subsequent appearance of the small-pox: that it is admitted by the "Committee that a few cases have been brought before them, of "persons having the small-pox, who had apparently passed through "the cow-pox in a regular way: that cases, supported by evidence "equally strong, have been also brought before them of persons who, "after having once regularly passed through the small-pox, either by "inoculation or natural infection, have had that disease a second "time: that in many cases in which the small-pox has occurred a "second time after inoculation or the natural disease, such recurrence "has been particularly severe and often fatal; whereas, when it has "appeared to occur after vaccination, the disease has generally been "so mild as to lose some of its characteristic marks, and even "sometimes to render its existence doubtful."

And, secondly, (Rept. Coll. Physicians, seq. page 7):—

"The security derived from vaccination against the small-pox, if "not absolutely perfect, is as nearly so as can perhaps be expected "from any human discovery; for among several hundred thousand "cases, with the results of which the College have been made "acquainted, the number of alleged failures has been surprisingly "small, so much so as to form certainly no reasonable objection to the "general adoption of vaccination; for it appears that there are not "nearly so many failures in a given number of vaccinated persons as "there are deaths in an equal number of persons inoculated for the "small-pox: nothing can more clearly demonstrate the superiority of "vaccination over the inoculation of the small-pox than this considera- "tion; and it is a most important fact, which has been confirmed in "the course of this inquiry, that in almost every case where the "small-pox has succeeded vaccination, whether by inoculation or by "casual infection, the disease has varied much from its ordinary "course; it has neither been the same in violence nor in the duration "of its symptoms, but has, with very few exceptions, been remark- "ably mild, as if the small-pox had been deprived, by the previous "vaccine disease, of all its usual malignity."

Increased numbers.

During the next twenty or thirty years the proportion of these puzzling cases was constantly on the increase, and in some epidemic seasons they presented a very alarming total.

Excessive anxiety;

Allowance might be made for many instances in which vaccination had evidently been performed without care or

knowledge; for some, in which spurious lymph had been used; for others, in which the immediate success of the operation had not been verified, and so forth; but, with all reasonable deduction from the aggregate, there still remained much to perplex and disappoint every honest observer. Injudicious friends of vaccination strove to disguise these facts; but there were still living some of their old antagonists who were not sorry to have another chance of victory; and happily there were also competent inquirers willing to look only for truth in the matter. And at no moment in the progress of Jenner's discovery had impartial investigation been more needed than now; for, partly by the facts themselves, and partly by hostile over-statement of them, public confidence began to be disquieted. There seemed a breach in the contract under which vaccination had been accepted. In what had promised so much, failures were all the more conspicuous: men looked to them, even where most exceptional, rather than to the successes of vaccination; and there were (1820–35) not a few persons whose minds began to misgive them, whether the old plan of small-pox inoculation had not perhaps been too easily abandoned.*

which further observations relieved.

To us, in the present day, this doubt cannot occur. The statistics I have quoted show beyond question that, whatever partial unexpected weakness may have been discovered in the protectiveness of vaccination, still—even with that weakness—its adoption has been followed by a reduction of

* Persons entertaining this doubt overlooked a possibility which happily for mankind has never been fully tested—a possibility that small pox inoculation, *if it had been generally adopted at a sufficiently early period of life to prevent infantine deaths by natural small-pox*, might itself have proved in many instances an impermanent protection. The following passage from the French Academical Report on the vaccinations of 1850 (p. 25) points in the direction here suggested, but is not sufficiently definite for a proof:—"L'inoculation elle-même n'était pas "plus efficace. De tous temps on a cité des faits contre son infallibilité. Elle "n'a pu se soutenir en Chine au delà de cinquante ans; après qui des épidémies "sont venues qui en ont montré les faiblesses; et, sans chercher si loin, "M. Debourge de Rollot nous apprend que sous le règne d'une épidémie à "Edimbourg et dans le Devonshire les inoculés ont eu plus à se plaindre que "les vaccinés." In the French Report there are no references which might enable the reader to verify these important assertions, and study in detail the experience which they represent.

small-pox mortality to a tenth and a twentieth of its former magnitude. But, in fact, long before these statistics could be compiled, popular observation, with rough and ready induction, had come to the same result. Every one could see that a vast majority of vaccinated persons escaped small-pox; every one could also see that if a vaccinated person caught small-pox he suffered from it comparatively little. And on those very occasions when the large number of persons suffering small-pox after vaccination was most calculated to weaken confidence in its absolute powers of prevention, there were the best opportunities to learn that if it sometimes failed to prevent, at least it might be relied on to mitigate.

Habitual mildness of post-vaccinal small-pox.

Thus, for instance, in a very severe epidemic of small-pox which prevailed at Norwich in 1819, Mr. Cross minutely observed 112 families, in all of which there were cases of the disease; and the annexed table shows the result. Among

Norwich.

——	Number.	Cases of Small-pox.	Deaths by Small-pox.
Total number of persons in the 112 infected households - - -	603	202	46
1. Protected by previous small-pox* -	297	—	—
2. Protected by vaccination - -	91	2	—
3. Unprotected - - - -	215	200	46

* Mr. Cross mentions that he met with several who were supposed to have had small-pox ormerly, yet notwithstanding took it on this occasion; but he does not state whether such cases are included in the above summary.

215 persons unprotected by vaccination there were 200 cases of small-pox, and of these 46 proved fatal; while among 91 vaccinated persons the only effects of this terrible infection were, (1) that one girl, who had been vaccinated nine years, "had a mild disease, limited to twenty pocks, " and lasted only six days before it began to decline,"

and (2) that another, who had been vaccinated five years, "went through the disease in half the time (of her un-"vaccinated sister) without danger or detriment; a few "very minute pits upon the tip of the nose being the only "permanent traces."

Edinburgh.

Similarly, Dr. Thomson, of Edinburgh, recounting, some years afterwards, his experience at about the same period, says*: "My observation of the very severe small-pox "epidemic which prevailed in Scotland from 1818 to 1823 "was carried on until I had had an opportunity of seeing "not fewer than 1,500 individuals affected with small-pox "after vaccination; and of this number only three died, "but none of them with the disease in that form which is "termed malignant. I saw also about 85 cases of small-"pox in persons who had previously passed through either "natural or inoculated small-pox, and of this number three "also died. In addition to these, I saw also 400 cases of "primary small-pox, out of which 100 died. These results "gave me a confidence in the conservatory effects of vacci-"nation, which nothing has since occurred to shake. Small-"pox has twice prevailed epidemically in Scotland since "1823, and from all I have seen and heard I am satisfied "that the proportion of deaths in the several classes of "patients I have mentioned did not materially differ from "that above specified. In the first of these epidemics the "deaths that occurred in the vaccinated were of adult males, "and in the second chiefly, I believe, of adult females."

Marseilles.

Similarly again at Marseilles†:—the number of cases and of deaths in the severe epidemic of 1828, and their relation to the vaccinated, non-vaccinated, and variolated masses of exposed population, were stated as follows; the first column

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* Seventh Report of Poor Law Commissioners, p. 148. In explanation of the very large number of cases of post-vaccinal small-pox witnessed by Dr. Thomson, it must be observed, that *chicken-pox* was epidemic in Scotland at the same time as small-pox; and Dr. Thomson, considering these diseases to be of identical nature, counted them both together in his total. Also see his "Account of the "Varioloid Epidemic, 1820," and "Historical Sketch of Opinions respecting "the Secondary Occurrence of Small-pox," 1822.

† Bousquet, Traité de la Vaccine; Paris, 1833; p. 195.

of figures representing an estimate (which of course can only be approximative) made for the purpose by the Société Roy. de Médecine:—

——	Number.	Cases of Small-pox.	Deaths by Small-pox.
Total number of persons at the ages (0–30) which were almost exclusively susceptible - - - -	40,000	6,020	1,024
1. Protected by previous small-pox -	2,000	20	4
2. Protected by vaccination - -	30,000	2,000	20
3. Unprotected - - - -	8,000	4,000	1,000

Copenhagen.

So also (as quoted by Steinbrenner) in Copenhagen:—of 659 vaccinated persons who suffered in the variolous epidemics 1823–27, only five died, being at the rate of 1 in 132; while of 176 unvaccinated persons who caught the disease, more than a fourth seem to have died; and of 153 others, who professed previously to have had small-pox, there died 31. And similarly in the epidemic of 1828-30, and part of that of 1832–37, it seems that out of 228 unprotected patients 63 had died; but of 1,373 cases of post-vaccinal small-pox only 14 were fatal.

Numerous other illustrations.

Observations, more or less to the same effect, have been made, I believe, in every country to which vaccination has extended, and at every time when epidemic small-pox has prevailed. Sometimes the difference has seemed less, sometimes more; but the fact of difference, and very great difference, in favour of vaccinated persons, as regards the severity of small-pox if it should happen to befall them, is made certain by the general and strong testimony of innumerable observers. In the adjoining table are illustrations selected from various sources, and it would be easy to multiply their number to any desired extent. The largest illustrations are generally least likely to be deceptive: I would therefore

point especially to the case of Bohemia, where (according to observations made for twenty-one years on four millions of

Places and Times of Observation.	Total Number of Cases observed.	Death-rate per 100 Cases.	
		Among the Unprotected.	Among the Vaccinated.
France,‖ 1816–41	16,397	$16\frac{1}{8}$	1
Quebec,* 1819–20	?	27	$1\frac{2}{3}$
Philadelphia,† 1825	140	60	0
Canton Vaud,† 1825–9	5,838	24	$2\frac{1}{6}$
Darkehmen,† 1828–9	134	$18\frac{4}{5}$	0
Verona,‡ 1828–39	909	$46\frac{2}{3}$	$5\frac{2}{3}$
Milan,** 1830–51	10,240	$38\frac{1}{3}$	$7\frac{2}{3}$
Breslau,† 1831–3	220	$53\frac{4}{5}$	$2\frac{1}{9}$
Wirtemberg,†† $1831\frac{1}{2}$–$5\frac{1}{2}$	1,442	$27\frac{1}{3}$	$7\frac{1}{10}$
Carniola,§ 1834–5	442	$16\frac{1}{4}$	$4\frac{2}{5}$
Vienna Hospital,† 1834	360	$51\frac{1}{4}$	$12\frac{1}{2}$
Carinthia,§ 1834–5	1,626	$14\frac{1}{2}$	$\frac{1}{2}$
Adriatic,† 1835	1,002	$15\frac{1}{5}$	$2\frac{4}{5}$
Lower Austria,† 1835	2,287	$25\frac{4}{5}$	$11\frac{1}{2}$
Bohemia,¶ 1835–55	15,640	$29\frac{4}{5}$	$5\frac{1}{6}$
Gallicia,† 1836	1,059	$23\frac{1}{2}$	$5\frac{1}{7}$
Dalmatia,† 1836	723	$19\frac{2}{3}$	$8\frac{1}{4}$
Lond. Small-pox Hospital,¶ 1836–56	9,000	35	7
Vienna Hospital,¶ 1837–56	6,213	30	5
Kiel,¶ 1852–3	218	32	6
Wirtemberg,‖ no date	6,258	$38\frac{9}{10}$	$3\frac{1}{2}$
Malta,‡‡ no date	7,570	21·07	4·2
Epidemiolog. Soc. Returns,‡‡ no date	4,624	19·7	2·9

* Thomson, Small-pox, p. 376. The Quebec epidemic is described to "have spread "rapidly among the unvaccinated, and carried off many adults as well as children. The "proportion of deaths in the unvaccinated was from 1 to $3\frac{1}{3}$ to 1 in 4."

† Steinbrenner, op. cit. pp. 105, 110, 231, 232, 280, 281, 283, 295. In the Breslau epidemic. one patient is stated to have suffered small-pox for a third time.

‡ Rigoni-Stern, as qnoted (p. 50) by Prof. Haeser; die Vaccination und ihre neuesten Gegner, 1854. It is mentioned that of twenty-four persons who during this period suffered second attacks of small-pox, no fewer than eight died.

§ Med. Jahrb. d. Œesterr. Staates, 1838.

¶ Details annexed in Supplement. The twenty years' experience of the Vienna Hospital is detailed in the Report of the College of Surgeons, and in the statement of Professor Hebra.

‖ Wunderlich's Handbuch d. Path. u. Therap. 1855, iv. 201.

** Canstatt's Jahresbericht, 1852.

†† Heim, op. infra citat. In these epidemics there were reported 57 cases of persons suffering small-pox for a second time; and of the 57, there were 16 fatal. In the Wirtemberg epidemics afterwards referred to, there were reported 86 cases of secondary small-pox, among which 12 were fatal.

‡‡ Seaton, on the Protective Value of Vaccination. Dr. Seaton quotes 203 cases of secondary small-pox, as reported to the Epidemiological Society. Of these 17 were fatal. In Mr. Marson's paper relating to the London Small-pox Hospital there are mentioned 47 cases of secondary small-pox. Of these 8 died from the disease, and 1 from an accidental complication.

people) the risk of death to vaccinated persons, if they happen to contract small-pox, is at the rate of $5\frac{1}{6}$ per 100 patients; but to non-vaccinated persons, when they contract small-pox, at the rate of $29\frac{4}{5}$ per 100 patients; or to the concurrent testimony of London, Milan, and Vienna, as showing, on an experience of nearly 26,000 cases, that post-vaccinal small-pox, if it occurs, is but a fifth or a sixth as dangerous as natural small-pox.*

Danger of small-pox to persons nominally vaccinated chiefly dependent on badness of vaccination.

This, however, is only a part of the case; and I venture especially to beg your attention to what remains, as it is of much administrative importance. When the above and similar statistics are seen in mass, it is merely noticed that,

* It will be observed in the foregoing table that the fatality of small-pox, as it occurred in unprotected persons, ranged from under 15 (Carinthia) to 60 (Philadelphia) per cent.: while in persons who contracted the disease after previous vaccination its fatality ranged from an inappreciable smallness to 11 (Lower Austria) and even $13\frac{5}{11}$ (Vienna Hospital) per cent. This extensive range in each column depends on various circumstances. Sometimes, no doubt, material differences of classification have been made, one observer having included while another has excluded cases of *true chicken-pox;* sometimes (where the observation is that of hospital practice) only the graver cases of small-pox have been admitted for treatment; sometimes, a particular epidemic has been in its form milder or more severe; sometimes (as the reporter mentions of 15 out of the 25 deaths in the Vienna Hospital in 1834) cases are included in which the fatal issue was not due to small-pox. But, generally speaking, such circumstances would affect equally both enumerations (vaccinated and unvaccinated) in any one epidemic, and would certainly give no fallacious result in favour of the former. And in comparing together the enumerations of *any one epidemic*, it will be noticed that always there is a marked difference in favour of the vaccinated class; so that they, if infected with small-pox, have not, even in extreme cases (Lower Austria or Dalmatia), incurred half the risk of non-vaccinated patients. In many lines of the above statistical table, true chicken-pox is no doubt often reckoned as small-pox. In the returns of the London Small-pox Hospital a distinction is drawn between it and the *varicelloid modification of small-pox:* the former is excluded, and the latter (almost entirely occurring in vaccinated persons) is retained. This plan probably gives the most correct means of comparison. From the line which relates to the Vienna Hospital in 1834, there are excluded 533 cases of so-called chicken-pox; and judging by the high death-rate which results for the vaccinated persons, I should suppose that "varicella" had there been allowed to include many cases which in England would have been grouped as "varicelloid modifications"—*i.e.* vaccinal mitigations—of small-pox. For the reverse reason, the Vienna experience of 1837–1856 gives rates lower than they would have reckoned here; for the total number of cases (6,213) includes 3,415 of so-called varicella; and of these, no doubt, a certain proportion would in England have been excluded as cases—not of vaccinal modification, but—of true chicken-pox.

among a number of persons suffering small-pox, those who have previously been vaccinated incur much less risk than others. But when such a mass is dissected, there comes out as a second fact, that this lesser risk of the vaccinated has a graduated scale of its own; and that, *among vaccinated persons infected with small-pox, the danger of the disease is chiefly determined by the badness and insufficiency of their vaccination.*

Mr. Marson's observations.

The establishment of this truth is the work of Mr. Marson, who for more than twenty years has been Resident Surgeon of the London Small-pox Hospital, and who founds his conclusion on many thousands of cases, which during this time he has attended, and of which he has kept accurate notes.* Conceiving it to be, for practical purposes, a discovery of high importance, I annex a copy (App. F.) of the original paper, in which Mr. Marson, four years ago, communicated it to the Royal Medical and Chirurgical Society of London; and likewise (App. G.) a copy of the petition, last year addressed by

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* Dr. Kinnis, formerly Superintendent of Vaccination at Colombo, in his "Report on Small-pox as it appeared at Ceylon in 1833–34," and in an Appendix relating to observations made by Dr. Forbes in the epidemic of 1830, gives enumerations from which the annexed table is compiled. It will be observed, that the gradation of death-rates, marked in the last column, though far

Occurrence and Fatality of Small-pox.

——	Number of Cases.	Number of Deaths.	Per-centage of Deaths.
(1) In persons decidedly not vaccinated - -	351	146	$41\frac{1}{2}$
(2) In persons having no marks, or but unsatisfactory marks of vaccination - - - -	199	52	$26\frac{1}{10}$
(3) In persons having satisfactory marks of vaccination - - - - - -	187	3	$1\frac{3}{5}$
(4) In persons having marks of small-pox - -	4	2	—

less detailed than in Mr. Marson's statement, is to the same general effect. And in the cases noticed by Dr. Kinnis himself the difference is further developed; for he distinguished persons pretending to have been vaccinated into such as had *no marks* and such as had *unsatisfactory marks* of vaccination, and found that the death-rate of the latter was $26\frac{1}{3}$, that of the former $32\frac{1}{7}$. Cases of chicken-pox are not included in the annexed table; and Dr. Kinnis gives at length (pp. 10–14) his reasons for concluding "that the febrile eruptive disease known "in Ceylon by the name of chicken-pox, arises from an infectious matter, "essentially different from that which produces small and modified small-pox." —Op. cit. Colombo Govt. Press, 1835.

Mr. Marson to the House of Commons, in which he briefly states the result of his large and laborious experience in small-pox and vaccination.

His conclusions, so far as they relate to my present point, are as follows:—That the fatality of small-pox, when it attacks the unvaccinated, is 350 per thousand; that its fatality to such vaccinated persons as it infects is, taking them indiscriminately, 70 per thousand; but, distinguishing vaccinated persons into two classes,—those, (first), who have been vaccinated in the best known manner, and those, (secondly), who have been badly vaccinated,—the fatality of small-pox, if it infects the former, will be 5 per thousand; if it infects the latter, 150 per thousand: that the risk of the one will be thirty times the risk of the other.

Almost perfect security given by good vaccination.

Such being the *almost perfect security* which well-performed infantine vaccination confers against death by small-pox, it remains to be considered whether here is the necessary limit of Jenner's benefaction to mankind. The remnant of danger is not great. But, such as it is, can it be prevented?

Further inquiry into post-vaccinal small-pox.

Two supposed causes of its occurrence.

Thirty years ago, when it first became notorious that small-pox might affect a certain proportion of persons previously and properly vaccinated, this partial failure of protection was explained on one or other of two suppositions:—Either (it was said) the vaccine contagion,* in its transmission through so many human subjects, must have lost by degeneration some of that specific protective influence which, in its former condition, it exerted on the human economy; or else there must be something essentially of uncertain constancy, something impermanent or liable to be impermanent, in the privileges which vaccination confers.

* I avoid speaking of the vaccine *lymph*, as being weakened by transmission through many human subjects, because this expression often represents a misunderstanding of what really occurs in the propagation of disease by morbid poisons. Lively arguments for the necessary degeneration of the vaccine contagion have proceeded on a belief that the original cow pox at each vaccination simply dilutes itself with certain passive juices of the vaccinated body, that it thus of course gets weaker and weaker at every stage, till at its thirty-fifth succession it is reduced—according to Dr. Nicolai—to at least the 8,809,458,688th fraction of its original power. This argument founds itself on a radical misapprehension of the infective process in question .... *Mutatis mutandis*, it might equally have been used to prove that the power of human procreation could not but cease soon after the days of Adam.

To the former of these possibilities I shall presently revert, and will now only remark, that, viewed as an alternative to the other, it was judged to be an insufficient explanation.

Lapse of time as a cause.

For what chiefly attracted attention was this: not that persons vaccinated by the surgeons of 1820–30 with the lymph of 1820–30 were less protected against small-pox than persons who had been vaccinated in 1798: but, generally, that persons who had been vaccinated ten or fifteen or twenty years, and who, during this interval, had perhaps repeatedly resisted small-pox, would at length, in a certain proportion of their number, yield to the infection. This had most frequently happened during times when small-pox was severely epidemic among the unvaccinated; and the earliest notice of the fact on a large scale in Scotland in 1818–20 merely meant that then, for the first time, large masses of persons with vaccination of many years standing were exposed to the test of a strong epidemic influence. Under this ordeal it had become evident that, for some vaccinated persons, the insusceptibility conferred by cow-pox was not of life-long duration. And from careful analysis of cases it was shown, that this lesser protectedness of certain vaccinated persons bore at least some proportion to the number of years which in each case had elapsed since vaccination. Some proportion, I say:—for, (first), there were not materials to prove any uniform rate of increase from year to year; and (secondly), the increase, such as it was, apparently continued up to about thirty years of age; after which period it seemed that, in the class of persons now under consideration, the liability to contract small-pox underwent a continuous decline. Thus (to select an illustration from a work to which I shall presently make more particular reference) Professor Heim, taking 1,055 cases of modified or unmodified small-pox in vaccinated persons, distinguished them under thirty-five heads corresponding severally to the number of years — from 1 to 35—which had elapsed since vaccination.* The thirty-five

* In a medical pamphlet of thirty-five years ago (Address to Parents and Guardians on the Present State of Vaccination, by a Candid Observer; London, 1822; p. 47) I read, "There are strong grounds for believing that this pecu- "liarity of constitution, which disposes to attacks of modified or vaccine small-

numbers corresponding to the thirty-five successive years are severally as follows:—15, 4, 4, 7, 10, 9, 12, 16, 17, 14, 14, 21;—44, 45, 62, 48, 59, 43, 57, 68, 44, 40, 50, 53, 52, 46, 41, 27, 41;—17, 16, 13, 6, 32, 8. It is true that, taken year by year, this series is irregular, as might be expected in so limited an experience; but, when it is divided into three successive parts—one for *the first twelve* years after vaccination, one for *the next seventeen*, and one for *the following six* years,—it appears that the average number of cases for each year is, in the first division 12, in the second division 48, in the third division 15. Or if the series be divided into seven successive parts—one for each quinquennium comprised in it—the seven quinquennial sums read thus:—40, 68, 186, 275, 239, 172, 75; and a corresponding subdivision of 653 cases which occurred at Copenhagen (according to Möhl, as quoted by Gregory) gives the series 14, 102, 173, 187, 156, 19, 2. A calculation of similar materials made by Professor Retzius (Gaz. Méd. de Paris, 1843), with respect to 961 cases in the Stockholm Hospital, gave the following series to express the average allotment of small-pox to each year of life in eleven successive quinquennia up to the age of fifty-five:—$3\frac{1}{5}$, $4\frac{2}{5}$, $13\frac{1}{5}$, $45\frac{2}{5}$ $51\frac{3}{5}$, 40, 20, $17\frac{3}{5}$, $3\frac{4}{5}$, $2\frac{1}{5}$, 1. Mr. Marson's copious information (App. F. pp. 19—21) tends to show the same thing.

Post-vaccinal small-pox made manifest by signs of artificial interference in the present distribution of small-pox deaths, as contrasted with their natural distribution before the discovery of vaccination.

This re-development of susceptibility to small-pox, as affecting a certain proportion of the vaccinated population, is a fact which becomes most evident when one compares the present ages of small-pox death with the ages of small-pox death before the discovery of vaccination. Formerly, the

"pox is hereditary." A medical friend writes to me, that he and his two brothers were vaccinated in infancy to the satisfaction of their then doctor, that some years subsequently, when they were severally aged 13, 11, and 7, the second of them contracted small-pox in a very severe form, and the other two caught the disease from him; that my correspondent himself, when 20 years of age, having occasion to attend the post-mortem examination of a patient who had died of small-pox, again contracted the disease, and in his turn communicated a second infection to both his brothers, who, like himself, had suffered it before. Dr. Neil Arnott tells me, that he attended in Spain a case of post-vaccinal confluent small-pox, where the patient's father had had small-pox twice, and her uncle three times, another uncle having died with a first attack of the disease. I have notes of an instance—published, I believe by Dr. Webster—where three brothers and sisters had had post-vaccinal small-pox; one of them once; another twice; and the other three times, including a last and fatal attack.

entire number of such deaths, distributed among the ages of life, constituted, from first to last, a declining series. Duvillard gives an analysis of the 6,792 small-pox deaths which happened during nearly two centuries (1580–1760) in the city of Geneva; and the numbers belonging to the six successive quinquenniads of life up to the age of thirty were 5,467, 1,058, 126, 54, 39, and 31; only 17 cases having fallen to all ages above thirty. In the adjoining table the difference between that former distribution and the distribution which now prevails in partially vaccinated populations is shown.

Proportionate Distribution by Age of 1,000 Small-pox Deaths in Geneva before the Discovery of Vaccination, and of the same Number in England, London, and Paris respectively, at Periods subsequent to its general Practice.

Ages.	Geneva, 1580–1760.	England, 1839 and 1847.	London, 1848–51.	Paris, 1842–51.
0–5	805	739¼	684	338
5–10	155¾	127½	131	59
10–15	18½	24½	29½	132¾
15–20	8	25¼	30	
20–25	5¾	30¼	48	329½
25–30	4½	18½	35	
30–35	2½	11½	19¾	109½
35–40		7¾	12	
Over 40		15¼	10½	31½
Total	1,000	999¾	999¾	1,000¼

The 6,792 small-pox deaths of Geneva during the period 1580–1760, and 12,941 registered small-pox deaths of England during the years 1839 and 1847, and 3,699 registered small-pox deaths of London during the years 1848–51, and 3,323 deaths reported by the Epidemiological Society to have occurred in Paris during the years 1842–51, are severally analyzed according to the ages at which they took place. For convenience of comparison they are all reduced to the scale of 1,000 and are reckoned for each age in reference to this total. In the column which relates to Geneva, the declining series from 805 to 2½ expresses what may probably be considered to have been the *natural* distribution of small-pox deaths among different ages in cities where it was frequently or constantly present. In its general signification, this declining series closely resembles the present distribution

of those infectious infantile diseases (measles, hooping cough and scarlet fever) for which hitherto no prevention has been found, and which therefore in their distribution express unmodified natural affinities.* In the remaining three columns of the table—those which relate to England, London and Paris, in the present century, and particularly in the column which relates to Paris during the ten years 1842–51, it will be seen that there is no longer an unbroken decline of the small-pox mortality, but that, after decline, there is again (for a time) increase.† This interruption is certainly artificial; and no doubt chiefly denotes the mortality of post-vaccinal small-pox. In other words, vaccination has established an interference with the natural series: at a certain period this artificial interference is to some extent withdrawn, and the death-list begins to contain cases which formerly would have belonged to early periods of life: cases, where vaccination has only sufficed to postpone the fatal infection.

I refrain from inserting in the text of this Letter any discussion of the very interesting pathological considerations by which those new facts in the science of vaccination may to some extent be interpreted. You will chiefly care to notice their practical result; namely, that men soon began to inquire, and by experiment to test, whether that absolute immunity against small-pox, which a vaccinated person in the lapse of years had partially lost, could by a second vaccination be renewed to him. And again, without dwelling on an immense detail of literature which records the tenta-

Re-vaccination proposed as the preventative of post-vaccinal small-pox.

* *See Note* III., page 306 : Relation of Current Contagia to Ages of Population.

† That nearly one-third of the whole number of small-pox deaths in Paris happens between the ages of 20 and 30 is one of the most startling facts I have learnt in my study on the subject. I can conceive for it no other explanation than that given in the text, and, if this be the true one, there must prevail in Paris an appalling amount of post-vaccinal small-pox. I cannot say whether difference of race may make any difference to that re-development of susceptibility to small-pox; still less can I venture to surmise whether so extreme an instability in the results of French vaccination may depend on anything peculiar to the French administration of this important agency. But if those indications be sound, which in a later part of this section I deduce from the history of re-vaccination in the Prussian army, there would apparently be cogent reasons for inquiring very critically into the *quality of lymph* which is current for the vaccinations of France.

tive re-vaccinations of private practitioners (among whom Dr. Harder of St. Petersburg deserves especial credit) it is enough to study what has been observed in the re-vaccination of great masses of men in various military establishments, especially in Germany.

Extensive trial in Wirtemberg.

The earliest large experience of this kind came from Wirtemberg. In 1829 the practice of re-vaccinating the troops of that kingdom was commenced; and its collective results for the next few years are recorded in an elaborate

—	Total.	Ratio of Success per 1,000 Cases Vaccinated.		
		Perfect Success.	Modified Success.	No Success.
Vaccination of the Wirtemberg Army in the five years $1831\frac{1}{2}$–$5\frac{1}{2}$ - -	14,384	340·2	248·3	411·5

13,681 of the above-mentioned 14,384 military vaccinations being classified according to the marks of previous vaccination or small-pox, the results were as under:—

Degree of Success of Re-vaccination.	Of Cases with Normal Cicatrices of Vaccination there were 7,845, and among these the results per 1,000 were,	Of Cases with Defective Cicatrices of Vaccination there were 3.545, and among these the results per 1,000 were,	Of Cases with no Cicatrices of Vaccination or Small-pox there were 2,025, and among these the results per 1,000 were,	Of Cases bearing marks of previous Small-pox there were 266, and among these the results as per 1,000 were,
Perfect -	310·4	280·7	337·3	319·5
Modified -	280·5	259	191·1	248·1
None - -	409·2	460·4	471·6	432·3

11,565 of the same number being distributed according to age, the results were as under:—

Degree of Success of Re-vaccination.	Under 20 Years of Age there were Re-vaccinated 124 Persons, and the results as per 1,000 were,	Between 20 and 30 there were Re-vaccinated 11,157 Persons, and the results per 1,000 were,	Above 30 Years of Age there were Re-vaccinated 284 Persons, and the results as per 1,000 were,
Perfect - - -	338·7	285·6	426·1
Modified - -	322·6	259·2	207·7
None - - -	338·7	455·2	366·2

form* by Professor Heim, of the Wirtemberg military service. The adjoining table presents an abstract of these results in relation to five years terminating with June 1836. There are parts of it from which (because of the complicatedness of the conditions) I will not venture on attempting to draw conclusions. But there are other parts of which the meaning is obvious.

First, let me observe that one line of the figures corroborates, in an indirect manner, the conclusions recently quoted from Mr. Marson. Besides 5,919 of the vaccinated on whom the operation produced no vacciniform result, there were 3,571 (or about 248 per 1,000) in whom it produced results approaching, but not quite attaining, what was strictly enforced as the criterion† of perfect success. These "modified "successes" form for comparison a group, less subject to accidental sources of fallacy than some other combinations in the table; and such *modification* is in its way (like an attack of small-pox) a measure of how far the influence of previous protection survives in those persons in whom it has begun to decline. Now, in tracing the degrees of this influence as present in the four different categories of vaccinated persons, and as expressed in proportions of those classes, it is seen that

"Modified" results of re-vaccinations.

* Historisch-Kritische Darstellung der Pocken Seuchen, etc., im Königreiche Württemberg, innerhalb der fünf Jahre Juli 1831 bis Juni 1836. Professor Heim also reports (though with less exactness) the results of 29,864 re-vaccinations performed by civil practitioners in different parts of Wirtemberg, and the general results were as in the annexed form.

Ratio of Success per 1,000 Cases Re-vaccinated.		
Perfect Success.	Modified Success.	No Success.
517·7	176·2	306·1

† Heim, op. citat, p. 594. Beim K. Militär wurde jede nicht mit dem reinsten Bilde einer vollkommenen Kuhpocke, oder mit zu grosser Randröthe und dem Anschwellen des Oberarmes verbundene Impfung unter den modificirten Erfolg locirt; wohin alle übrigen pustulösen Abnormitäten des Exanthemes gerechnet wurden, die manchen Impfchirurgen verleitet haben könnten, sein "guter Erfolg" auszusprechen. Als erfolglos wurde jeder nicht bis zur Blasenbilding gesteigerte Lokalprozess, und das was man falsche Kuhpocken zu nennen pflegt, aufgerechnet. Nur das ungetrübte Abbild der bei erstmals geimpften Kindern für gut erklärten Schutzpocke wurde auch an den Revaccinirten "gut" prädicirt.

the proportion is highest (280½) in those who showed normal marks of previous efficient vaccination; next (259) in those whose previous vaccination marks, though visible, were imperfect; next (248) in those who had had small-pox; and least (191) in those who, whether they had previously had small-pox, or been vaccinated or not, showed no scars of either infection.

More than a third of the whole perfectly susceptible of re-vaccination.

But the table shows, even more unquestionably, another great fact. It shows that on the average of more than 14,000 experiments (an immense majority performed at between 20 and 30 years of age) 34 out of every 100 re-vaccinated persons developed the same sort of vesicle as would arise from a first insertion of vaccine lymph. And it is important to observe, that this renewed susceptibility to cow-pox did evidently not depend, so far as could be traced, on any original ineffectiveness of the former vaccination; for (as is expressly set forth in the second part of the table) among the 14,384 subjects of vaccination there were 7,845 who presented strictly normal scars of previous vaccination; yet nearly a third of this large number gave again exactly such local phenomena as arise in children when vaccinated for the first time.

What inference may be drawn from this?

Is it then a legitimate inference from these figures, that, if the same 14,384 soldiers had been exposed to an atmosphere of small-pox infection, every third man would have caught the disease? Certainly not. Inoculation of lymph (whether vaccine or variolous) is, so to speak, a finer and more delicate test of susceptibility to the small-pox poison than is the breathing of an infected atmosphere; so that many persons, when the lymph of cow-pox or small-pox is inserted in their skin, will give—locally at least—evidences of susceptibility which no atmospheric infection would have elicited from them. And of this, perhaps, there can be no more ready illustration than by noticing (either in another part of the annexed table, or on a still larger scale in a subsequent table, which represents the re-vaccinations at Kasan) that persons who bore marks of previous small-pox were, in at least equal proportion with previously vaccinated persons, capable of producing perfect vaccine vesicles: and probably they too, if tested with variolous matter, would have shown at the inocu-

lated part similar signs of susceptibility ; whereas, notoriously, of persons who have once had small-pox, not nearly one-third becomes afterwards capable of contracting small-pox by frequenting the neighbourhood of the sick.

For this reason (greatly corroborated by what had already in every-day practice been observed of the immunity of once-vaccinated persons) it was evidently impossible to argue that *all* who on re-vaccination yielded perfect vaccine vesicles would, on ordinary exposure to small-pox infection, have become infected with small-pox. On the other hand, it might fairly be suspected that they would have been distinctively *the endangered class:* not that all or nearly all of them would have suffered; but that from among them more than from among other vaccinated persons, the occasional sufferers by small-pox would have come.

The experience of other countries did not fail, so far as it went, to confirm the general accuracy of the Wirtemberg observations. Especially in the Prussian army, in 1833—at the commencement of a system to which I shall presently revert as having given other remarkable results—there were re-vaccinated between forty and fifty thousand adults, and in about 33 per cent. of the entire number this re-vaccination took with perfect success. In a re-vaccination of Russian soldiers at Kasan,* Dr. Thiele observed that in 28 of each

Prussian re-vaccinations.

Russia.

RESULTS OF 1,795 ADULT VACCINATIONS AT KASAN.

In Subjects as follows:—		Perfect Success per 100 Cases.	Imperfect Success per 100 Cases.
Presenting marks of previous small-pox -	1,436	$18\frac{7}{8}$	$5\frac{6}{7}$
Presenting marks of previous vaccination	247	$18\frac{3}{5}$	$9\frac{3}{4}$
Presenting neither -	112	$29\frac{6}{13}$	$16\frac{1}{12}$

RESULTS OF DANISH RE-VACCINATIONS.

Perfect success - - - -	12,041
Modified success - - -	6,131
Perfect or modified success obtained at a second trial - - - -	1,532
Complete failures - - -	4,241
Total - - -	23,945

* Henke's Zeitschr., 1839.

hundred cases the operation succeeded perfectly or imperfectly; that the rate of perfect success was $18\frac{3}{5}$ per cent; and (as there happened to be vaccinated at the same time 1,436 persons presenting marks of previous small-pox) that perfect vaccine vesicles would arise just as often on persons who had once had small-pox as on persons who had once been vaccinated. Of nearly 24,000 re-vaccinations practised in the Danish army* in the four years 1843–5 and 1847, more than half were attended with perfect success, and more than a quarter with modified success. There remained between a fifth and a sixth, on whom (though most were submitted to a second trial) no impression could be produced. Of 1,050 re-vaccinations, practised in the Brunswick army* in 1844, 502 gave the perfect and 130 the modified result. In 1844 there were practised, in the army of Baden,† 20,483 vaccinations, and the results stated in per-centages were as follows:—perfect success, 38·6; modified success, 26·6; failure, 34·7. In a less extensive re-vaccination (3,170 cases), which had taken place four years earlier, the perfect successes had been at the rate of $26\frac{1}{3}$ per cent., and the modified successes at the rate of $38\frac{1}{3}$. The proportion of perfect successes was also 27 per cent. in 2,355 re-vaccinations which took place in Baden in 1842.

Denmark.

Brunswick.

Baden.

Effects of re-vaccination against post-vaccinal small-pox.

By the earliest of these various independent observations it was put beyond question, that the same lapse of time, which renders some vaccinated persons again susceptible of small-pox, renders them also again susceptible of cow-pox. But it remained to be seen whether that second dose of the latter infection, which it was the object of re-vaccination to introduce, would restore such persons, either permanently or for a long while, to the state of security from which they had declined; whether, by successful re-vaccination, their revived susceptibility to small-pox would once more be extinguished.

Nearly thirty years have elapsed since the commencement of this practice on a large scale, and it may now fairly be judged by its fruits.

In Wirtemberg.

As early as 1838 Professor Heim reported its results in Wirtemberg to the following effect:—That during the five

* Oppenheim's Zeitschrift, vol. 27. † Henke's Zeitschr., 1842.

years 1833–7, though small-pox infection had been sixteen times imported into different regiments of the army, there had ensued among the 14,384 re-vaccinated soldiers only—in the person of one whose re-vaccination two years before had been followed by "modified" success—a single instance of varioloid. And, similarly, in the civil practice of the kingdom during the same time, among nearly 30,000 re-vaccinated persons, there had occurred only (1) a mild case of varioloid in a woman who four years before had been re-vaccinated apparently with "modified" success, and (2) a case so trifling that it was called chicken-pox in a man who, fifteen years before, at the age of 13, had been, if not re-vaccinated, at least successfully vaccinated. Yet, within these five years, the infection had been present in 344 localities of Wirtemberg; producing 1,674 cases of true or modified small-pox among the not re-vaccinated and in part not vaccinated population of 363,298 persons, in those places where it had prevailed.*

In Prussia.

Better, because longer and larger, experience of the same kind is that of the Prussian army, as recorded year after year, by Dr. Lohmeyer, in the successive volumes of the *Berliner Medizinische Zeitung*, from 1833 to the present time. In Prussia (just as in Wirtemberg) the practice of re-vaccination grew out of the knowledge that small-pox

* In these epidemics (as in all where small-pox has attacked a certain proportion of the vaccinated population) the mildness of the disease in such vaccinated persons, as compared with the unvaccinated, and even with those who had previously suffered small-pox, was constantly observed. The annexed table, compiled from Heim's material, illustrates the fact. Its chief results are

Total of Variola and Varioloid.	Cases, 1,677.	Deaths, 198.
1. Bearing marks of vaccination, or said to have been vaccinated -	1,055	75
2. Unvaccinated - - -	387	96
3. Having previously had small-pox	57	16
4. Undetermined - - -	178	11

inserted in the table at page xix. It should be added, that, in Wirtemberg, great pains were taken, by isolation of the sick, to prevent any general spread of contagion.

would ultimately attack a certain proportion of those who had been vaccinated only in infancy. This knowledge, too, had been dearly purchased in the Prussian army; for, during the ten years preceding 1831, cases of post-vaccinal small-pox were increasing in number and fatality; attacks were counted annually by many hundreds; and within the three years 1831–3 there had occurred no fewer than 312 deaths by small-pox. For the last twenty years the Prussian army has represented an almost entirely re-vaccinated population. And what has been the contrast? 104 annual deaths by small-pox was the last experience of the former system; 2 annual deaths by small-pox has been the average for the re-vaccinated army. Analysing moreover the 40 fatal cases of small-pox which, during the last 20 years, have occurred in the Prussian army, we find that only 4 of the number were of persons who (it is said) had been successfully re-vaccinated.

In Bavaria, Denmark, and Sweden.

Other illustrations of the same conclusive kind may be gathered from the experience of other countries. From 1843 re-vaccination has been compulsory in the Bavarian army; and from that date to the present time (we are told) neither a single death by small-pox, nor even a single case of unmodified small-pox, has occurred in that population.* For the last 21 years re-vaccination has been general in the Danish army, and for the last 13 years in the Danish navy; and these two populations (we are informed) have almost entirely escaped contagion during several epidemics of small pox.† The practice of Sweden has been similar, and its results also satisfactory.‡

Dependence of post-vaccinal small-pox on original incompleteness of vaccination.

The preceding pages have shown that a liability to post-vaccinal small-pox does, in considerable numbers of persons, tend to develop itself from about the period of puberty, and that against this danger re-vaccination gives the desired security. It remains to be considered, as an important practical question, whether that occasional tendency to lose the advantages of a first vaccination depends on such vaccination having itself been originally imperfect.

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* App. p. 170. † App. p. 171. ‡ App. p. 185.

Mr. Marson's observations have shown that the severity of post-vaccinal small-pox is least where the local signs of vaccination are sufficient and satisfactory. Whether post-vaccinal small-pox be less frequent (as well as less dangerous) in the same ratio, is as yet not certainly known. But, while recognizing the affirmative to be in the highest degree probable, we must admit that small-pox—though commonly in its most modified degrees—does occur in some whose scars of vaccination are in every respect normal. So that, according to such experience as hitherto exists on the subject, it may be said that, by some change proper to the vaccinated body itself in the course of its development, the protective influence even of apparently perfect vaccination tends, more or less, with time to become weakened.

Does vaccination become less protective by a weakening of its contagion in successive transmissions?

But—now reverting at length to a doubt which I have already mentioned—is there any reason to believe that this occasional impermanence of protection has, directly or indirectly, depended on impairment in the specific power of vaccine contagion? an impairment become possible, since Jenner's first collection of facts? an impairment arising in the transmission of that contagion through many generations of men? On this difficult question contrary opinions have been expressed.

Opinion of Nat. Vaccine Establishment.

In a recent Annual Report (1854) of the National Vaccine Board the following paragraph occurs:—"We feel it our "duty, in order to dispel any doubts which may still affect "the public mind, to repeat what we have so frequently "stated with unabated confidence that the vaccine lymph "does not lose any of its prophylactic power by a continued "transit through successive subjects, and that it is a fallacy "to predicate the necessity of resorting to the original source "of the cow for a renewed supply." This opinion, advanced with the authority of an establishment which, for nearly fifty years, has been concerned, and of late almost wholly concerned, in the distribution of vaccine lymph, is entitled to very respectful consideration. It represents, probably, the convictions of the permanent officers of the Board, Dr. Hue and Mr. Tomkins, founded on their own observations and correspondence, and endorsed by the three ex-officio members

of the Board, who, on occasion of this Report, were Dr. Paris, Mr. Luke, and Dr. Nairne.

Contrary opinions.

The opinion, however, does not seem to be universally shared in other countries of Europe; and, even in England, it has been received with much hesitation by those unofficial persons who have given most labour and ability to the study of vaccination. Some have argued that the vaccine contagion must naturally and inevitably become deteriorated in its successive human transmissions*; and perhaps, it is only as against this unqualified belief that the above quoted, equally unqualified, opinion, has many adherents. Others believe such degeneration to be only a contingent danger.* But in a large concurrence of testimony it is recognized at least as a possibility which has very frequently been realized.

Facts alleged.

From so long as forty years back, definite allegations have been made, purporting to prove that the power of vaccine lymph, as derived from successive contagions of the human subject, had progressively diminished. For instance, M. Brisset,† as early as 1818, declared that the past ten years had made a very marked difference in the visible characters of the vaccine vesicle; adding, that, for protective purposes, it was now necessary to produce, instead or Jenner's two vesicles, eight or ten points of infection; and Dr. Meyer,‡ of Kreutzburg, not only made the important remark, that, on examining in 1824–25 nearly 4,000 vaccinated persons of all ages, he had found the older scars of vaccination much better marked than the recent ones, but also stated, on the authority of the district vaccinators, that the proportion of unsuccessful to successful vaccinations was every year growing larger; and further, happening at this time to obtain

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* *See Note* IV., page 308 : Degeneration of Vaccine Contagium.

† M. Brisset discusses the question in the Mém. de la Société de la Faculté de Médecine de Paris, 1818, and in his Réflexions sur la Vaccine et la Variole; Paris, 1828. In the latter (p. 166) he says :—"La manifestation et surtout la "cessation des symptomes de la vaccine me paraissent notablement abrégées; "la marche de cette maladie est plus prompte..... La tumeur vaccinale "(dont le développement est si essentiel pour constater l'activité du virus vaccin "et l'efficacité de la puissance préservatrice de la vaccine) est infiniment moins "proéminente, si même on peut dire qu'elle existe."

‡ Quoted by Steinbrenner, op. cit. p. 493.

for his own vaccinations a regenerated supply of lymph, he was able to make the supplementary observation, that this almost invariably acted with effect, and that the resulting cicatrices were again after the old normal type. Other assertions to the same effect were not infrequent; but opportunities of verification were rare, and the most important investigations of the subject belong to the last twenty years.

Comparative experiments.

Successive comparative experiments by M. Bousquet, Dr. Gregory, Mr. Estlin, Professor Hering, M. Fiard and Dr. Steinbrenner, have established, I think, beyond the possibility of reasonable doubt that certain original properties of the vaccine contagion have very generally declined, after its long, successive descent from the cow. It may require separate discussion whether all of these properties are of primary importance to the purpose of vaccination: but the fact at least seems certain, that, when the first difficulties of converting the cow-pox into a human contagion have once been overcome, this newly-humanized contagion shows an amount of infective power which is not usual in lymph of long descent. The former *takes*, as the phrase is, in persons with whom the latter has failed; often, for instance, in re-vaccination. It excites local changes of an intenser kind; so active, indeed, as to render caution necessary in its use. The vesicle produced by it runs a full course; compared with which the progress of common vaccine vesicles seems unduly rapid and their termination premature. Also it renders more certain, and apparently more characteristic, that slight febrile disturbance which is proper to the action of cow-pox on the human system.

Importance of these facts in relation to the continuance of small pox:

Now it is important to remember, that, in the comparative observations referred to, the lymph which has been stated more or less to have lost its original properties, has commonly been the current lymph of the country—the lymph of the public service. Those experiments, therefore, virtually say that millions of vaccinations have been performed with lymph not fully possessing its original endowments; and they make it at least very questionable, whether an indefinite length of transmission of the vaccine contagion, without renewal from the cow, has not been of public detriment.

Namely (1) of infantine and other natural small-pox;

For, assuming only that vaccine lymph is generally more likely to produce its expected *immediate* results in proportion as it is of short pedigree, I think this difference not unimportant. Frequent failures in vaccinating not only disappoint and annoy both parties concerned, not only discredit the operation and the operator, but likewise too often lead to an ulterior evil. Ignorant persons look rather to the mere doing of the operation than to the subsequent signs of its success; and it thus constantly happens that children who have been but nominally vaccinated are left with no further attempt to secure them against small-pox.

and (2) of post-vaccinal small-pox.

Likewise, looking to some other peculiarities which mark the action of vaccine lymph in its earlier generations, especially to that more prolonged course of the local eruption, and to that more decided febrility which attends it; symptoms, both of them, which seem to say that this infection grasps deeper and more largely into the system; I should very much hesitate to consider their occurrence indifferent to the ultimate issue of the operation. Not venturing to speak otherwise than with sincere diffidence on what I deem one of the deepest problems in pathology, I may yet urge at least the *probability* that these symptoms may be the very signs and measures of that total bodily change which vaccination is intended to effect. If this be a true interpretation of their meaning, surely a vaccination which is deficient in such consequences must inspire less confidence than another. And from the observations I have quoted, it would then apparently result that, after long periods of human transmission, the contagion of cow-pox has proved unable to excite in the vaccinated body its *maximum* of protective change; that lymph of shorter descent has been more successful in dispossessing the body of that ingredient which constitutes its susceptibility to small-pox.

Statistical test.

Is it, then, the case that an extensive use of degenerated lymph has determined that too frequent impermanence of protection against post-vaccinal small-pox? It is chiefly from national statistics that the answer must be sought; and the critical question to be asked in any country where the vac-

cine supply has seldom or never been renewed from the cow, is this:—Assuming that, from 1800 to 1840, every year's vaccination has included *a certain proportion* of infants who eventually (say 15–25 years afterwards) have become re-susceptible of small-pox—*has this proportion from year to year progressively increased.*

Increasing re-susceptibility of small-pox in the vaccinated?

In respect of small-pox itself there are no facts, I believe, nearly sufficient in amount for even an approximative answer to this question;* but in respect of a closely kindred issue there are some materials of a very suggestive sort. For, if it should appear that the proportionate re-susceptibility of vaccination at a given age were undergoing a uniform progressive increase, this—like a uniform progressive increase of post-vaccinal small-pox—would make it almost certain that primary vaccination had progressively become less effective. And it is difficult to conceive how the infantine generations of a country could, crop by crop, successively derive less permanent constitutional impressions from vaccination, unless the efficient cause of those impressions—the vaccine contagion itself—had year by year undergone enfeeblement of its powers.

Increasing re-susceptibility of vaccination?

The case which I put as hypothetical, apparently represents the actual and immense experience of the Prussian army. There, the re-vaccination of recruits is a very uniform test. It extends annually to some forty or forty-five thousand operations. It is reported on annually. Its records run back twenty-four years. Its total result must tell of a million experiments: and the subjects, naturally, are of like age, in like proportions, and under like circumstances. I have already had occasion to say, that when, in 1833, this system of re-vaccination commenced, the proportion of successful

Successive reports of re-vaccination in the Prussian army.

* It deserves to be noticed, however, that so long ago as 1833, Mr. Loy, of Whitby, gave (Med. Gaz. vol. xii., p. 48) an affirmative answer to the question, "I have observed (he says) in my own practice for many years that vaccination "afforded uniform protection; and since then an influence from vaccination "less and less effectual in resisting the contagion of small-pox;" and after citing instances to justify his belief, that post-vaccinal small-pox was progressively becoming both more frequent and less modified, he comes to a "conclu-"sion, that the vaccine virus had lost parts of its virtues," and recommends "reverting to its origin" as a remedy for this evil.

results (including cases in which the success came only with a second attempt) was 33 in every hundred vaccinations. Now the annual per-centages of successful results, for the whole time during which re-vaccination has been practised in the Prussian army, beginning with that number, run thus:—33, 39, 42, 46, 49, 50, 51, 54, 57, 58, 57, 57, 58, 60, 64, 64, 64, 61, 64, 69, 69, 69, 69, 70. The last proportion of success exceeds the double of that with which the series commenced. Thirty-three per cent. expresses the proportion in which persons vaccinated, say twenty years previously, had, in 1833, to a certain extent lost the influence of their infantine vaccination: it measures the impermanence of certain impressions produced by the vaccinations of 1813. And that impermanence (such as it was) in the effects of vaccination has increased, almost without exception, year by year, during this quarter of a century; so that the vaccinations of 1836—tested by eventual re-susceptibility to cow-pox—were not half so stable as the vaccinations of 1813.

Inferences as to the frequency of post-vaccinal small-pox.

That post-vaccinal small-pox may depend to some considerable extent on a primary incompleteness of that specific change which vaccination should have excited in the system; and that such incompleteness may have depended on an inactive degenerated state of the vaccine contagion;—these would seem, on analogy, reasonable inferences from the facts I have stated.* More than this I will not venture to say; for that remarkable series of figures, even with the observations previously alleged, does not constitute a proof, though it amply justifies suspicion.

The subject is one that deserves full and patient inquiry. Post-vaccinal small-pox has been a disappointment both to the public and to the medical profession. It has indeed been well to know of it that its attacks are mild in proportion as vaccination has been well performed. But better still

* It would not also follow that the imputed condition of lymph had been an inevitable consequence of its long descent. The alternatives apparently would be these:—either the enfeeblement of the contagion has resulted, slowly but necessarily, from this mere fact of its many successive transmissions;—or else, the effects of personal carelessness in the selection of lymph (see *Note* V) are capable of perpetuating and diffusing themselves enough to affect, very considerably, the national statistics of small-pox.

would be its utter absence. The information I have quoted to you encourages a belief that, with uniformly thorough infantine vaccination, such attacks would be extremely infrequent as well as extremely mild; provided — on the strength of these last intimations — that an essential condition of thorough vaccination shall be the employment of lymph in its utmost original efficiency. Fortunately Mr. Ceely's scientific experiments, and the very useful proceedings of Mr. Badcock at Brighton, have taught the medical profession in this country that it is not requisite to depend, for renewed sources of cow-pox, on the casual occurrence of this disease in the dairy. And, although I do not feel justified in stating it as proved, that what partial insecurity still attends even well-performed vaccination would certainly cease under a more frequent (if careful) imitation of those expedients, yet, at least, I would urge them as deserving deep consideration.

General results as to the good of vaccination.

Finally, then, to sum in a few paragraphs the practical results of this section, the last half-century's experience of vaccination justifies the following assertions:—

that in countries where vaccination is general, the fatality of small-pox has under its influence declined to some small fraction of that which formerly prevailed; that where formerly, in a given population, there would have occurred one hundred deaths by small-pox, there may now occur as few as four or five; and that in this very greatly diminished number annually dying of small-pox the immense majority are unvaccinated or ill-vaccinated persons:

that vaccination performed in infancy in the best manner gives to most persons through life a complete security against attacks of small-pox:

that (in some—hitherto undetermined—proportion to the whole number of the vaccinated) certain persons, as they approach adult life, partially or wholly recover that susceptibility to small-pox which vaccination had once extinguished in them:

that perhaps more universal permanence might be given to the protective influence of infantine vaccination by

well-devised arrangements for the periodical renewal of lymph; but certainly, that the renascent liability to small-pox may be guarded against by re-vaccination performed at about the period of puberty:

that even when small-pox is contracted by persons who, having been vaccinated in infancy, have not afterwards thus renewed their protection, the disease is greatly mitigated in favour of these exceptional sufferers; so that among the best-vaccinated of their number, according to the experience of the London Small-pox Hospital, its fatality is but $\frac{1}{70}$ and its chance of being confluent but $\frac{1}{10}$ as compared with the fatality and the chance of confluence of natural small-pox in unvaccinated persons:

that if, beyond the above qualifications, there still remain apparent exceptions to the uniform protective power of vaccination, they illustrate only that very infrequent peculiarity which occasions some individuals (especially in certain families) to suffer natural small-pox itself twice or thrice or even oftener; and

that, if vaccination were universally performed in the best known manner, deaths by small-pox would be among the rarest entries in the death-register.

IV.—Alleged Drawbacks from the Advantages of Vaccination, and alleged Dangers of its Practice.

[Note.—*In revising this chapter for the Editor, and here and there amending sentences, where I have believed I could thus give clearer expression to my original meaning, I have, at pages* 268–9, *omitted (but with marks of omission) some bits of argument which seem to me to have become obsolete; and at page* 275 *I have interposed, within brackets, a reference to some later knowledge which modifies the opinions of thirty years ago.*—J. S., 1887.]

Retrospect.

In England, since the termination, fifty years ago, of that important inquiry which was conducted by the College of Physicians, medical literature, even of the obscurest class, contains no more mention of "new, unheard of, and monstrous

diseases," ascribed to the influence of vaccination. Nor, so far as I know, can it be said that any person enjoying in the smallest degree the confidence of the profession, or in the smallest degree entitled to offer an opinion on medical evidence, maintains that properly-performed vaccination is a dangerous proceeding. Diseases produced by vaccination occupy in medical teaching and medical conversation about the same space as diseases produced by witchcraft and the evil eye; and it seems a waste of time to revert to what, even half a century back, was recognized to be mere stupidity or mischief-making.

Foreign echoes of our old controversy.

But in some other parts of the world these questions were not in the first instance so freely canvassed as in England; and perhaps on this account it may be that within the last ten years there have been published abroad papers which correspond to our Stuart-and-Rowley period in the history of vaccination. To the English medical reader such papers, if they come at all, come only as a kind of literary fossil; reminding him of something so utterly unpractical, antediluvian, and extinct, that the last act he would think of committing against them, would be to argue. Yet these foreign publications obtained a momentary notice in the last Parliament. And now, standing at the very threshold of the subject on which I must enter, they compel some recognition at my hands.

It is really quite impossible for me to speak of such writings with even the semblance of respect. I am willing to believe that the authors are not actuated by unworthy intentions. But the works are so ignorantly and so impudently written, their staple consists of such reckless guesswork or such mere declamation and balderdash, that it would be a mockery to treat them as belonging to the literature of science.* I can regard them only as trivial romances; and accordingly, while I propose discussing in this section of my Letter every substantial statement which has been raised against the practice of vaccination, I must claim to leave unfollowed the mere meanderings of nonsense in which those

* *See Note* V., p. 311 : Renewed attacks on Vaccination.

writers indulge. Instead of arguing with them whether vaccination has increased men's consumption of tobacco and lessened their tendency to dance, I will bring before you—in reference to more important issues—such accurate knowledge as I can gather, from national statistics and from the records of scientific experience, as to the real health of vaccinated populations.

Questions which may fairly be asked.

I. Undoubtedly, as to alleged incidental evils of vaccination, there are questions which may reasonably be asked. The fifty-nine years' experience which has established the merits of vaccination—has it shown any countervailing harm? Have vaccinated persons, in acquiring their insusceptibility to small-pox, become more suspectible of any other disease? Has anything tended to show that vaccination, however perfect for its purposes, is in other respects a disadvantage?

Fallacy to be guarded against in putting the question.

In proceeding to investigate this matter, there is, first, a source of fallacy to be guarded against. Those millions whom vaccination saves from one kind of premature death must of course die eventually. Susceptibility to small-pox is a very definite state of body; equally definite and distinct are the susceptibilities to other specific diseases; and it has never been pretended that man becomes less susceptible of one because he is less susceptible of the others. Vaccination is directed against the one susceptibility only; and a child whose liability to small-pox has just been extinguished by well-performed vaccination may to-morrow, like an unvaccinated child, be run over, or be drowned, or sicken of measles, or suffer with teething, or be struck with any other of the numberless shafts of death. And the vaccinated subject advancing to adolescence, to mid-life, or to old age, must encounter, like the unvaccinated, the several risks of each period of life. And obviously, if vaccination on a given day in England secures a thousand lives against death by small-pox, sooner or later those lives will be subject to the inevitable lot; sooner or later the thousand deaths will be written against the names of other diseases than small-pox; and such diseases may then be said to have been rendered more frequent by vaccination. In the same sense every life that is

snatched from fire, or flood, or poison, counts at last as a death from some other cause; and to say *in this sense* that such causes are more fatal than before vaccination, is but another form of saying, what Jenner would most have wished to hear, that small-pox is less fatal than it was.

Question in its amended form.

But are deaths *proportionally* more numerous? On a given number of persons (say a million) is the general death-rate higher, or is the death-rate at any particular age higher, or is the death-rate of any particular disease higher, now, than in the days of inoculated or natural small-pox? Has the suppressed mortality of small-pox commuted itself for other premature death?

The material of vital statistics is hitherto not sufficiently perfect; indeed, the science in its more precise applications is of too recent date, for this question to be answered exhaustively. But I have collected some very strong statistical evidence on the subject; and, such as it is, it tallies very thoroughly with what pathology would suggest as probable—that to have mitigated the horrors of small-pox, is, indeed, an unmixed good.

I. General death-rates.

First, for the *general death-rates*:—Taking all ages together and all diseases together, what used to be before the practice of vaccination, and what has been since the practice of vaccination, the annual proportion of deaths to a given number of living persons?

England. London.

As regards England, the means of comparing death-rates are confined to London; for before 1838 there was no general registration of deaths; and even in London they must be regarded as only approximative to the truth. During times before vaccination, there were the old Bills of Mortality; and for the last twenty years there are the Registrar General's reports. The Bills of Mortality are notoriously imperfect. They record not deaths, as such, but burials; and not all burials within the given area, but only parochial Church of England burials. Therefore much may have been omitted from them. But it is satisfactory to know, for the purposes of the present comparison, that whatever imperfectness there is in these records would make the older times appear less unhealthy than they were.

Now the question being—whether in proportion to the diminution of small-pox, there have grown up other influences to neutralize or even reverse the advantage, I am able, so far as the general death-rate of London is concerned, to give you the following evidence. My colleague, Dr. Greenhow, Lecturer on Public Health at St. Thomas's Hospital, has made an elaborate examination of the Bills of Mortality at two different periods, far apart, before the discovery of vaccination; selecting the two particular decennial terms, 1681–90 and 1746–55, only because at a central year in each of these terms the population of London was estimated, and this estimate of population is a necessary element in the comparison. Dr. Greenhow has kindly assisted me with a paper (Appendix H.) in which he gives at length the results of this interesting comparison; and I attach the more importance to his conclusions as I know that they have been arrived at with caution and impartiality. The annexed Table gives an abstract of

Average Annual Death-rates in London from all Causes and at all Ages.	
Date.	Per 10,000 living.
1681–90 - -	421
1746–55 - -	355
1846–55 - -	249

so much as relates to the present point. It enables you, at a glance, to judge, in respect of London at least, how far it would be correct to say, that, with the decline of small-pox, the general death-rate of the population has increased. You will notice that in the decennial period 1846–55,—*though epidemic influenza and two visitations of cholera* fell within it,—the general death-rate per 10,000 of living population was 25 per cent. less than in the decennial period 1746–55, and 40 per cent. less than in the decennial period 1681–90; having successively declined since the remoter period from 421 to 355, and from 355 to 249.

Materials for a similar but more extensive comparison are given from the pen of Dr. Farr, in the fourth edition (vol. ii. p. 613) of McCulloch's "Descriptive and Statistical Account of the British Empire." From this valuable paper I have extracted (seq. pag. 256) a Table which is of great interest in reference to all the present section of my subject; and I here insert from it those totals which illustrate the point I am discussing.

You will observe, that in the successive lines of the annexed Table the general death-rates of London are given

Average Annual Death-rates in London from all Causes and at all Ages.

Date.	Per 10,000 living.
A. 1629–35	500
B. 1660–79	800
C. 1728–57	520
D. 1771–80	500
E. 1801–10	292
F. 1831–5	320
G. 1840–54	$248\frac{9}{10}$

for seven different periods of time during more than two centuries. The first line (A) shows for the period 1629–35 (though almost exempt from epidemic disease) a general death rate just double our present one; in the second line (B) it is seen that for the twenty years 1660–79 (including the fatal one 1665) the rate was $3\frac{1}{5}$ times as great as it now is;* and in the fourth line (D) it is shown, that during ten years (1771–80) towards the end of last century, when small-pox was fourteen or fifteen times as fatal as now, the general death-rate was still double.

Means of extending such comparisons to other countries than our own are but scanty; yet fortunately there are illustrations enough to show that London is not alone in

* See foot-note to the table at p. 256.

Denmark.

respect of the evidence which it gives. A statistical sheet (App. p. 171) which accompanied the general information given us by the Danish Government, contains an account relating to the city of Copenhagen, not only of deaths by

Births and Deaths in Copenhagen.	Excess of Births over Deaths.	Excess of Deaths over Births.	Average Annual Excess.
1750–75	—	22,186	Deaths 853
1776–1815	—	3,285	Deaths 82
1816–50	10,648	—	Births 304

small-pox for the years 1750–1850, but also of the total deaths, and of the births and population, during the same long period—half a century before and half a century after the introduction of vaccination. Causes of death are not (except small-pox) specially noticed; but the general result is enough to show that the statistics of Copenhagen concur with the statistics of London; for the sheet in question gives evidence of progressive improvement in the health of the population, and the year 1823, when for thirteen consecutive years there had not been a single death from small-pox, was also in other respects among the healthiest of the series. And the general progress of the population may be inferred from these particulars:—Of the 26 years 1750–75 there were 23 in which the deaths exceeded the births:—of the 40 years 1776–1815 there were 25 in which the deaths exceeded the births:—during the 35 years 1816–50 the births have exceeded the deaths on all but six occasions. Annually during the first period there were on an average 853 more deaths than births: annually during the last period, there were on an average, 304 more births than deaths.*

* Eighty years ago the notion that London might contain an increasing population seems to have been strange to men's minds. In a pamphlet of that period (Letter to Dr. Lettsom, by an uninterested Spectator of the Controversy upon General Inoculation: London, 1779) I read the following paragraph:—"I claim not the merit of starting this idea of an increased population in "London as a novelty; it has been hinted by others, particularly by yourself in "your medical memoirs, and by a writer who signs J. S. . . . but I think his "reasoning is not quite conclusive."

The more minute statistics of Sweden (to which I must presently refer again) are equally silent as to those compensatory deaths which the suppression of small-pox is imagined to cause. In the annexed Table, ranging through Sweden.

AVERAGE ANNUAL DEATH-RATE in SWEDEN from all CAUSES and at ALL AGES.

Date.	Per 10,000 living.
1755–75 - -	289
1776–95 - -	268
1821–40 - -	233
1841–50 - -	205

N.B.—The *annual* small-pox death-rate during the period 1841–50 averaged less than the *weekly* death-rate from small-pox and measles during the period 1755–75.

the past hundred years, it is seen that in that well-vaccinated country the general death-rate of the population in 1841–50 is 29 per cent. lower than it was in 1755–75. If a third of this improvement be due to the comparative absence of small-pox, the remaining two thirds must be referred to the simultaneous decrease of other diseases.

So far, then, as these populations are concerned, it appears that, while under the influence of vaccination small-pox has been diminishing its ravages, so under other influences have other diseases been diminishing theirs. Under other influences, I say:—for the causes of fever, the causes of cholera, the causes of consumption are several and special causes. Each disease is affected for better or worse by influences proper to itself; and the prevention of small-pox no more implies the prevention of fever than to sow barley implies the reaping of wheat. But what has to be noticed (so far as these materials inform us) is, that annihilation of small-pox may be tried for as an unqualified physical good; that hitherto there is no trace of evidence that other diseases become more malignant in proportion as that one is subdued. Conclusion from general death-rates.

It now remains to be seen, whether, by a more detailed analysis of mortuary records—by inquiry into the death- II. Death-rates at particular ages and from particular diseases.

rates of particular ages and into the prevalence of particular diseases—it may perhaps be possible to discover any kind of evil which the general death-rates have failed to betray.

M. Carnot's doctrine.

Recent pamphleteers against vaccination chiefly rely on certain fragmentary statistics, collected with more zeal than judgment by a former artillery officer, M. Carnot.* This writer believes he has discovered what he calls a *displacement of mortality*; namely, that within the present century deaths which used to occur in early infancy have come to occur between the ages of 15 and 30. He alleges that the female death-rate in Paris for the ages 15–25 has doubled in the last 38 years; that the annual mortality of the French army on home-service was 2 per 100 during the period 1819–47, but had been only 1 per 100 before the Revolution of 1789; that of male and female deaths in Paris at ages above 15 only 35 per 100 used to happen between the ages of 15 and 45, and that now 50 per 100 are in this category: that the chances of an infant reaching 41 years of age are the same now as they were in the last century; that the death-lists of Paris for 1840–49, compared with those for 50 years previously, show some diseases (typhus, cholera, dysentery, and colic) to have increased almost as much as others (small-pox, measles, convulsions, and croup) have declined; that the annual marriages in France exceed twice as much as they 40 years ago exceeded the marrying proportion ($\frac{4}{5}$) of females who annually (on Duvillard's estimate) reach the connubial time of life, and that this increase denotes a doubled annual number of second marriages, or in other words a doubled annual quantity of early widowhood; that with a greatly increased number of marriages in France there is a diminished number of births; that the births are rapidly tending to become less numerous than the deaths; that the depopulation of France is an imminent danger, which must begin to realize itself within the next few years; that gastro-intestinal disease—especially typhoid fever—is the agent of

* Essai de Mortalité comparée avant et depuis l'introduction de la Vaccine en France; Autun, 1849; followed by an *Appendice*:—Analyse de l'influence exercée par la variole, ainsi que par la réaction vaccinale; Autun, 1851:—Parallèle de l'état sanitaire de Paris avant et depuis la vaccine; Rév. Méd. 1856.

this destruction; and finally, that the cause of this complicated derangement is the practice of vaccination.

Its logic.

Now, first, let the concluding word of the summary be criticized. M. Carnot's statistics allege a difference in adult vitality between the France of to-day and the France of last century. Supposing the statistics to be correct, does he give any sufficient reason for ascribing to vaccination that deteriorated state of adult life which he professes to have discovered? So little does he this, that in any of the sentences where damnatory conclusions are drawn, if there were substituted at hazard for his word *vaccination* the mention of any other historical event belonging to about the same period of time as Jenner's discovery, M. Carnot's logic would scarcely suffer by the change, or his new conclusion be less warrantable than his first. *Post ergo propter* was never more whimsically illustrated. For the argument goes simply to claim as the *effect* of vaccination whatever evils have happened *since* its discovery; and M. Carnot's moderation may be praised, that, with the infinite resources of this proof, he did not also convict Jenner of causing last year's inundations of the Rhone.

Its facts.

But are the facts such as M. Carnot pretends? I do not feel myself competent to discuss a doubtful question in the vital statistics of France; for I am but imperfectly acquainted with the relative value of those semi-official documents to which reference is made.*

M. Dupin's counter-statements.

Instead of offering opinions of my own, I will inform you that immediately after the publication of M. Carnot's first statements, M. Charles Dupin, before the Academy of Sciences (Nov. 20, 1848) treated the pretended discovery as an unmodified mare's-nest, and soon afterwards (Dec. 4) advanced

* Only I must observe that M. Carnot's superstructure of arithmetical conclusions rests on a treacherous basis; for his main argument proceeds from certain assumptions as to the ages of the population, and I have reason to believe that such assumptions are little warranted by existing knowledge. Death-rates at given ages, and expectations of life at given ages, are questions of proportion between the two quantities—how many at such ages are *living* and how many at such ages *die?* The latter element may generally be gathered from civil registers; but the former can only be got from a census of the population classified according to ages; and I am not aware that any such census had been made in France before the present century.

counter-statistics, which claimed to show the expectation of human life at every age in France as having notably improved since the last century.*

Dr. Bertillon's calculations.

More recently, Dr. Bertillon, Physician to the Hospice de Montmorency, after statistical researches which include both periods under discussion, has communicated to the Academy of Medicine results which are in direct opposition to M. Carnot's deductions.† In the Vaccination Report for 1854 of the Academy of Medicine, M. Bertillon's labours are mentioned in terms of the highest praise, and his conclusions are adopted without reserve.

The subjoined Table gives a summary of these conclusions, as stated in the report of the Academy. It states, for eleven periods of life, what was and what is the average expectation of death, viz.:—first, for different times in the last century, according to the several accounts successively published (1749–1806) by Dupré St. Maur, Montyon, Messance, and Duvillard; and, secondly, for the years 1849–50, according to M. Heuschling's account of the deaths in France and to several recent accounts (one of them founded on census) of the French population. In the fourth line (which is critical for the present question) the Table is read thus:—For persons aged between 20 and 30 the chance of dying was, in the first period, one in 67·97; in the second period, one in 66·40; in the third period, one in 64·67; in the fourth period, one in 73·55; in the fifth period, according to various more or less defective estimates of the population (the first of which specially illustrates a statistical fallacy) one in 73·38,

* M. Dupin concludes his paper in the following terms:—"L'allongement de "la vie à toutes les époques de l'enfance, de l'adolescence, de la virilité, de l'âge "mûr et de la vieillesse, pour les personnes de conformation pareille, voilà le "grand fait établi par les comparaisons rigoureuses que nous venons de présenter. "C'est le bienfait obtenu par les progrès des sciences et des arts appliqués au "bien-être du genre humain. Formons des vœux pour que nos demonstrations "mathématiques mettent un terme aux assertions erronées, et désolantes, "propagées par mille écrits et par mille déclamations qui s'appuient sur les "mortalités prétendues croissantes par l'effet du malheur et de la misère, qui "diminuent au lieu d'augmenter notre patrie."—Comptes Rendus de l'Acad. vol. xxvii. p. 571.

† L'Union Médicale, 1855; and Rapport sur les Vaccinations pratiquées en France pendant l'année 1854. This Report, though relating to 1854, is but recently published, and was not received here till March 25, 1857.

one in 86·20, one in 92·80; or finally, according to the census of the population, one in 93. Or if—simplifying the comparison—we take only the first column, which corresponds to the middle of last century, with the last column, which purports to be the most trustworthy account of the present state of life in France; and reduce the figures in both to the form of *death-rates per* 10,000 *living at the ages in question*, we find it stated, that for persons aged between twenty and thirty the death-rate used to be 147, and is now only 107½; that for persons aged between thirty and forty the death-rate used to be 215, and is now only 97.

Chances against death $\left(\frac{\text{Pop.}}{\text{D.}}\right)$ at different Ages of Life.	Successive periods of 18th century.				1849-50. Deaths by Heuschling, and Population by various authorities.			
	Dupre St. Maur.	Montyon.	Messance.	Duvillard.	Population cited as fallacious.	Population by Guillard.	Population by Mathieu.	Population by Census of 1851.
0 to 5 years -	7·17	7·05	9·59	8·28	12·05	13·60	14·80	13·19
5 „ 10 „ -	50·16	48·90	41·93	88·10	78·11	91·80	98·80	93·57
10 „ 20 „ -	113·90	103·80	85·30	108·00	124·74	146·30	157·90	151·50
20 „ 30 „ -	67·97	66·40	64·67	73·55	73·38	86·20	92·80	93·00
30 „ 40 „ -	46·45	47·56	58·00	58·73	78·85	92·66	95·80	103·00
40 „ 50 „ -	38·34	38·67	45.00	46·14	60·57	71·20	70·40	77·00
50 „ 60 „ -	26·92	28·11	32·00	30·72	34·47	51·00	48·20	54·00
60 „ 70 „ -	17·17	17·17	18·00	17·31	21·78	25·28	23·30	24·20
70 „ 80 „ -	8·21	8·21	10·35	8·84	10·37	12·18	10·58	10·50
80 „ 90 „ -	5·63	5·56	6·68	4·68	5·21	6·12	4·78	4·48
90 „ 00 „ -		3·84	5·34	3·87	3·76	4·17	2·82	2·73

The following are the terms in which the French Academy of Medicine reports its judgment on Dr. Bertillon's work, and on the controversy which occasioned it:—

Estimate by the French Academy of Medicine of the above statement and counter statements.

"De cette longue et laborieuse investigation il résulte que, de
" quelque manière qu'on interprète les documents anciens et nouveaux
" de la statistique, à la condition de n'abdiquer ni les lois de la logique
" ni celles de la science, on arrive à des conclusions écrasantes pour
" les adversaires de la vaccine en particulier, et en général pour les
" contempteurs sceptiques du progrès. Car ce n'est pas par l'examen
" d'un ou deux documents individuels, c'est par l'accord unanime de
" tous les documents, qu'il est démontré que, depuis le siècle passé,

" depuis l'époque qui a précédé immédiatement notre grande révolu-
" tion, la mortalité s'est considérablement atténuée à toutes les périodes
" de la vie ; que particulièrement de vingt à trente ans, âge auquel,
" d'après les anti-vaccinateurs, la variole, d'abord vaincue, exercerait
" sournoisement de mortelles représailles, le danger de mort a diminué
" d'environ un quart. Aujourd'hui, 1,000 citoyens de vingt à trente
" ans ne fournissent que 10 à 11 décès, tandis qu'autrefois le même
" nombre de sujets en donnait au moins 13 à 14. Et les autres âges
" sont beaucoup plus favorisés que celui-ci !

"Enfin, bien que, pour l'armée et pour la ville de Paris, les docu-
" ments soient insuffisants pour mesurer avec exactitude, même depuis
" 1820, la diminution de mortalité, ils suffisent pour affirmer qu'il n'y
" a eu nulle aggravation ; tandis qu'au contraire des considerations
" puisantes démontrent pour Paris une tendance manifeste, dans un si
" court espace de temps, à la diminution des chances de mort, bien que
" le regrettable silence de la municipalité ne nous permette pas de
" dégager complément cette tendance pour l'apprécier numériquement.
" Rien, par consequent, absolument rien qui puisse motiver les excen-
" triques et persévérantes assertions des détracteurs de la vaccine.

" Si nous voulons résumer les causes qui les ont égarés, nous dirons
" que toutes leurs erreurs ont pour source commune l'ignorance des
" principes de la statistique et l'inexpérience de sa méthode, le
" manque complet de discussion et de critique, critique d'autant plus
" indispensable que les documents sont plus imparfaits. A chaque
" instant on les voit s'appuyer sur des hypothèses en contradiction
" formelle avec les conclusions bien connues de célèbrès et nombreux
" travaux. On les voit prendre pour mesure de la mortalité moyenne
" d'une nation, ici la mortalité allégée des rentiers, ailleurs la mor-
" talité aggravée des soldats. Plus loin, il confondent la table de
" survie avec la table de population, et tirent de l'une les conclusions
" que l'autre seule permettait. N'ayant aucune notion des lois qui
" régissent les mouvements de population, ils prennent pour une
" calamité la diminution lente et progressive des naissances, bien que
" ce mouvement régulier suive la prolongation de la vie humaine, et
" détermine dans la nation la prédominance des âges producteurs.
" S'ils veulent la survie applicable à une ville dont la population est
" la plus mobile, la plus incessamment et profondément remuée dans
" toutes ses parties, ils se servent d'une methode qui suppose l'immo-
" bilité et la régularité absolue dans la succession des vivants et des
" mourants. Ils supposent stationnaire une population croissante ;
" ils la supposent décroissantes suivant les âges, quand elle croît d'un
" âge à l'autre.

"Il ne leur suffit point de se jouer si audacieusement de la statistique ;
" ils ne respectent pas davantage les simples lois du calcul. Ils raison-
" nent, avec des quantités qui ne sont vraies que relativement à
" d'autres, comme si elles étaient vraie absolument. Ailleurs, au
" contraire, quand un rapport seul peut les instruire du danger de
" mort, ils omettent de s'en informer. Et ce qui est plus étrange
" encore que tous ces contre-sens, que tous ces défis portés à la science,

" c'est l'aisance parfaite avec laquelle ils s'y abandonnent, ne parais-
" sant pas se douter que ces matières aient pu être traitées avant eux ;
" c'est sans discussion préalable qu'ils supposent non avenus les
" célèbres travaux des Malthus, des d'Ivernois, des Benoiston des
" Villermé, des Quetelet, en sorte que ce qu'on peut faire de mieux
" en leur faveur est d'accuser leur instruction pour disculper la
" légèreté de leur procédés."*

Observation of other countries.

Thus much in answer to the question, whether the main facts of the case are such as M. Carnot pretends. A very slow increase, or possibly a decrease, of the French population at the present time seems indeed to be an admitted fact: and it is stated (I believe on the authority of official documents) that the standard of height for admission to the French army has of late years of necessity been reduced, because of the decreased stature of the general population; while nevertheless the proportion of conscripts found physically incapable of service has undergone a continuous increase.†

Be it so. Admit these allegations. Admit also every arithmetical conclusion, however contested, which M. Carnot founds on ambiguous fragments of imperfect local evidence. Admit every hypochondriacal presentiment—every assertion which M. Dupin and Dr. Bertillon and the French Academy of Medicine concurrently declare to consist in mere statistical error. And what then? Would any reasonable person proceed from these particulars to construct a universal theory (the first deduction from which must be that such particulars are general in Europe) never verifying his theory by any second instance, never looking for those imputed effects of that same cause in other lands where it operates? Should it not be a first impulse to ask, are these things so elsewhere? Do other countries suffer like this pitiable image of France? Is England beginning to be depopulated? are its women becoming less fruitful? Does Sweden show a *déplacement de la mortalité?* is its adult life now more precarious than

* Rapport sur les Vaccinations de 1854, pp. 66–9.

† It is beyond my present business even to question the truth of these assertions ; much more, to investigate, what, if they be true, may have been the real causes of the alleged deterioration and comparative sterility of the French people. The subject has been a good deal discussed in the periodical literature of the day ; and there M. Carnot may easily learn that for his favourite facts there exist more reasonable explanations than his own.

fifty years back? In Geneva, where mortuary records have been kept for three centuries, are any such results reported? Is the re-vaccinated army of Prussia wasting away with a quadrupled mortality? Does Bavaria, among its conscripts for military service, show an increased proportion of incapables?

The most cursory examination of this kind might have convinced M. Carnot, that, whether his local arithmetic be right or wrong, his general medical conclusion is untenable.

Increase of population in Great Britain.

He might have read, for instance, in the Report of the Census of Great Britain in 1851, an announcement (I. p. 82) that "the most important result which the inquiry establishes " is, the addition in half a century of ten millions of people " to the British population; that the increase of population " in the half of this century nearly equals the increase in all " preceding ages; and that the addition in the last ten years " of 2,300,000 to the inhabitants of these islands exceeds " the increase in the last fifty years of the eighteenth " century." Or, so far as relates to the nineteen years during which a general registration of births has existed in England, he might have learned that, with us, at least, there is no evidence of a failing fecundity; that in the early part of this period (1838–40) for every 1,000 women aged between 15 and 45 there were registered 133$\frac{1}{3}$ living births, and in the latter part of the period (1851–56) for every 1,000 such women 144$\frac{1}{3}$ living births.

Death-rates of different ages in Sweden.

And whatever fallacy belongs to the imperfect condition of vital statistics in France might have been avoided, if M. Carnot had but studied the admirable records of Sweden; where not only would he have found, in respect of that well-vaccinated country, no evidence of the "displacement " of mortality" which he ascribes to vaccination, but would have seen how much better now than during last century are the chances of every period of life. In the annexed Table (for which I have to thank Dr. Farr) an abstract is given of the Swedish returns. You will observe that even in the penultimate period (within which the fatal cholera epidemic of 1834 killed 12,637 persons) the population at all ages under 30 years of age, consisting of course for the most part of vaccinated persons, showed a much less death-

rate than the population of the like ages in the former century. And in the next period (1841–50) when vacci-

Annual Mortality to 1,000 Persons Living.

Ages.	21 Years (1755–75).	20 Years (1776–95).	20 Years (1821–40).	10 Years (1841–50).
0–5 - - -	90·1	85·0	**64·3**	**56·9**
5–10 - - -	14·2	13·6	**7·6**	**7·8**
10–15 - - -	6·6	6·2	**4·7**	**4·4**
15–20 - - -	7·6	7·0	**4·9**	**4·8**
20–30 - - -	9·2	8·9	**7·8**	**6·8**
30–40 - - -	12·2	11·6	11·8	**9·8**
40–50 - - -	17·4	16·1	16·7	14·5
50–60 - - -	26·4	23·9	26·0	23·6
60–70 - - -	48·1	49·3	49·4	46·3
70–80 - - -	102·3	104·1	112·9	102·8
80–90 - - -	207·8	197·4	243·7	228·5
90 and upwards -	394·1	351·3	396·4	375·8
All ages - - -	28·9	26·8	23·3	20·5

The figures which are put in heavier type relate to that section of the population which has been born since the introduction of vaccination, and of which (persons under 30 in the fourth, and under 40 in the fifth column) the greatest part is undoubtedly vaccinated. Of persons ten years older, especially in the last column, many are vaccinated; of persons still older, a diminished and diminishing proportion.

nation would have affected at least all ages up to that of 40 years, the corresponding death-rates show an improvement on the earlier vicenniad 1821–40, and a still more striking improvement on the death-rates of the last century.

As regards the City and Canton of Geneva—specially interesting for comparison because of the great length of time over which the records extend—M. D'Espine, with no controversial object, arrived some years ago at results which can afford no encouragement to M. Carnot; and the appended Table is part of one in which M. D'Espine has very compendiously expressed his conclusions. You will observe, that although in its first column it bears testimony to the diminished pressure of infantile disease, the mortality which has been saved to infancy and childhood shows no signs of having been displaced into the next following periods of life. On the contrary, while the per-cental chance at birth of living

to 10 years of age has increased in Geneva within the last century from 60 to 74; the per-cental chance for those who

Survivance in Geneva at various Periods from 1560 to 1843.	Per-centage of those Born who reach 10 Years of Age.	Per-centage of those Living at 10 Years of Age who survive to 40.
City of Geneva :		
1560—1600	42	43
1601—1700	48	53
1701—1760	60	68
1761—1800	61	71
1801—1813	69	72
1814—1833	74	72
City and Suburbs:		
1816—1830	74	74
Canton:		
1838—1843	74	71

Annales d'Hygiène publ. et de Méd. légale, tom. xxxviii.

complete 10 years, that they will continue living to the age of 40, has increased from 68 to 72.

England. The English population was never classified according to ages till the census of 1841; and therefore a similar comparison between its past and present condition is not possible. But at least, in looking at the composition of a given number of deaths now and in the previous century, it is easy, where one compares similar populations, to see that deaths in early adult life have not taken the place of those which formerly befell infancy. Thus, if I contrast Dr. Short's account* of 405,951 deaths within the Bills of Mortality of London for the years 1728–43 with an account† which I kept of 22,332 deaths registered within the City of London during the

* New Observations on City, Town, and Country Bills of Mortality, &c. By Thomas Short, M.D. London, 1750, p. 92.

† Report on the Sanitary Condition of the City of London for the year 1854–5, Table VI.

years 1848–55, I find (as in the annexed Table) that the two periods differ considerably as to the proportion which

Composition of 1,000 Deaths in London at two Different Periods.

Ages.	Bills of Mortality, 1728–43.	Registration of City of London, 1848–55.
0–5	455	375
5–10	36	42
10–20	31	42
20–30	76	63
30–40	91	80
40–50	93	90
50–60	82	92
60–70	62	100
Over 70	74	116

different ages contributed to every thousand deaths. In the former period, persons aged sixty and upwards were only 136 per 1,000; in the latter period, were 216. In the former period, deaths under forty years of age were 689 per 1,000; in the latter period, only 602. And of deaths at ages above fifteen, those between fifteen and forty-five constituted in the later period not (as in Paris) 50, but about 37 per cent. This argument, of course, is not nearly so good in kind as might be drawn from the divisional death-rates of a population classified according to age; but the latter material, as I have said, is inaccessible;* and I adduce the present argument, though unsatisfactory, chiefly because M. Carnot has used it in respect of the Parisian population: and I wish to notice, in illustration of the essentially local character of his facts (if facts they be) that the mortuary records of London and Paris would lead him to opposite conclusions.

Military establishments.

Similarly, when M. Carnot deplores — it is said, mistakenly—the enfeebled health of the French army, *infiniment moins capable que leurs devanciers de supporter les privations*

* *See Note* VI., p. 312: Comparison of English Death-rates from all Causes in Pre-Vaccination and Post-Vaccination times.

et les fatigues inséparables de la guerre; and when another statistician of the same school alleges that the proportion of French conscripts declared physically unfit for military service has, since 1816, been an increasing one; how obvious the course, if one would understand such facts (assuming them for the moment to be facts) to inquire whether they belong only to France, or are common to many European countries. Such an inquiry would have led the alarmists to doubt the accuracy of their own local observations. It would have told them that in the Bavarian army,* during the period 1821–51, the per-centage of physically unavailable conscripts has not increased, but diminished, from $23\frac{1}{3}$ at the beginning of the period to $21\frac{3}{4}$ at its close: that in this army, vaccinated and re-vaccinated as it is, the death-rate for the years 1844–47 has been even better than that somewhat arbitrary standard of healthiness which M. Carnot adopts from Deparcieux's *select* lives of the last century; and that in the Belgian and Prussian armies, according to the same authority, the death-rates were little less favourable.

The preceding evidence will have satisfied you, I think, that M. Carnot's assertions are such as he cannot substantiate. You have seen that, even as regards France, his fundamental statements are flatly contradicted; and that the sanitary statistics of France, if they were such as M. Carnot pretends, would bear no such particular reference to the subject of vaccination, nor be so corroborated by the statistics of other countries, as in any degree to justify his conclusions.

Death-rates by particular diseases.

Yet let me beg you, before leaving the subject, to look at it in one other aspect. Although the accusers have not been very scrupulous about their arguments, still they have thought it necessary to enter into some detail as to the mode in which the world is to be depopulated, and as to the symptons of that vaccination-poisoning which they denounce. It is well that they have done so. The more detailed an inquiry, the more advantageous it becomes to truth; and those who are accustomed to the cross-exami-

* Würdigung der Vortheile der Kuhpockenimpfung, von Dr. Reiter, p. 40; and Die Vaccination und ihre neuesten Gegner, von Dr. Haeser, p. 32.

nation of witnesses, will not wonder that the traducers of vaccination have committed themselves to opposite details. "Under the mastick-tree" and "under the holm-tree" were the small but sufficient discrepancies of two famous accusers; and this case is recalled to one's mind, as one finds that the theories which charge vaccination with destructive results differ as to the diseases by which it kills. "Les maladies " du poumon n'ont pas eu de part sensible à l'accroissement " de la mortalité de la jeunesse," is the result of M. Carnot's arithmetic: "le vaccin a corrodé les poumons" is among the invectives of M. Verdé de Lisle. To the former accuser, croup is among the diseases which have diminished; while to the latter (who will admit no gleam of hope for mankind) it is among those which are "presque généralisés par " le vaccin."

Whether these gentlemen agree or differ is, after all, of little importance. They are so ignorant of medicine, that what they accept or reject is a matter of no scientific moment. But the question whether vaccination, in rendering persons less susceptible of small-pox, renders them more susceptible of any other disease, is one of pathological interest, and one which may reasonably be considered.

To a great extent it is already answered, and especially so in a practical sense. The preceding statistics having shown you for the present century frequent instances of large reduction in general death-rates, with improvements in the expectation of life at all ages, it becomes comparatively unimportant to consider whether this or that disease contributes more or less to the diminished total. But there are two special classes of disease to which it is well to advert; because, respecting them, some random assertions have been made, that they, since the introduction of vaccination, have become more numerous.

Scrofula and fever.

I refer first to what are called *scrofulous affections*— including that terrible scourge of human life, pulmonary consumption, or phthisis; secondly, to *continued fevers*, and especially to that kind or variety (typhoid fever) in which

certain glands of the intestinal canal undergo a characteristic inflammation.

Sources of fallacy in comparing past and present diseases.

It will be obvious to you that the comparison of present with past diseases is one extraordinarily liable to fallacy. Names of disease are constantly varying: not only because the language of physic changes with the general language of the country; but more especially because, as the anatomical and chemical knowledge of disease is extended, nomenclature becomes more precise, and maladies which had been lumped together under one undescriptive name get their several distinctive titles. Instead of troubling you with medical instances of this very notorious fact, I may remind you that zoology and botany and chemistry illustrate the same process. This may be seen in comparing our scientific lexicons with those of the last century, and observing that animals and plants, and chemical elements and compounds, have "increased since the practice of vaccination," simply because the study of nature has not stood still since the age of Linnæus, Buffon, and Scheele. Later science has added facts to their inventory, has recognized old affinities in altered light, and has broken into new parcels the former groups of premature classification. So it has been with diseases: our increased vocabulary has been in proportion to the great scientific progress of the last thirty years; it denotes that more distinctive enumeration of disease by anatomical or chemical characters which is due to the labour of Laennec and Louis, and Rokitansky and Bright, and innumerable others who have developed these studies of medicine.

Statistics of the subject.

Therefore I cannot refer to statistics with entire facility. But, taking such as can be found, you will notice that all their evidence points one way.

London.

The two annexed tables (to which I have already referred) furnish the means of comparison as regards London. The former of them gives the abstract of Dr. Greenhow's investigation: the latter is the work of Dr. Farr. As you glance below at the names of disease transcribed from the old Bills of Mortality, and as you read the notes to

Dr. Greenhow's table in the Appendix (p. 29) you will appreciate the difficulty to which I just referred. Both tables have been constructed with due regard to those sources of fallacy; and it seems impossible to examine their details without being satisfied on the matter in hand.

General and Differential Annual Death-rates in London per 100,000 Living at Three different Periods during the 175 Years 1681–1855.

Date.	From all Causes.	From Small-pox.	From Pulmonary Affections.		From Fevers.	From Strumous diseases.
			Including Pneumonia.	Exclusive of Pneumonia.		
1681–90 - -	4210	313·9	693	693	633	801
1746–55 - -	3550	304·4	734	734	539	1099
1846–55 - -	2490	33·8	682	528	385	206

Fever.

First, with regard to fever:—Dr. Greenhow, throwing into one group all those deaths of the present day which might have been included under the old application of the word "fever" (counting scarlet-fever and inflammation of the brain, and inflammation of the lungs in this category) still finds that, even with this large addition, the so-called "fever" of the present day occasions only a death-rate of 385 per 100,000, whereas a century ago its death-rate was close on 539. And Dr. Farr, in commenting on the somewhat similar materials which he contributed to McCulloch's work, remarks, without reference to any controversial point, that "fever has progressively subsided since 1771;" and that the combined mortality of small-pox, measles, and scarlatina is now "only half as great as the mortality formerly occasioned by small-pox alone."

Scrofula. Consumption.

So again, says Dr. Greenhow, with scrofulous affections. Exclude phthisis from the comparison (because of the formerly imperfect means of recognizing its presence) and the scrofulous death-rate per 100,000, which in 1681–90 was

801, and in 1746–55 was nearly 1099, is now but 206; so that, looking to the middle of the last century,—the

GENERAL and DIFFERENTIAL ANNUAL DEATH-RATES in LONDON per 100,000 Living at Seven different Periods during the 226 Years 1629–1854.

Causes of Death.	Bills of Mortality.						Registration Returns. (Dr. Guy.)
	1629–35	1660–79*	1728–57	1771–80	1801–10	1 831–5	1840–54
Small-pox - -	189	417	426	502	204	83	40
Measles - -	16	47	37	48	94	86	58
Scarlet fever - -	?	?	?	?	?	53	90
Fever - - -	636	785	785	621	264	111	101
Spotted fever - -	45	90					
Plague - - -	125	1225	—	—	—	—	—
Dysentery - -	221	894	50	17	1	1	9
Surfeit or cholera -	63	148	1	?	?	135	78
Pleurisy - -	14	6	10	5	4	39	6
Asthma and tisick -	?	?	112	85	89	136	45
Consumption - -	1021	1255	905	1121	716	567	323
King's evil, scrofula -	14	19	5	5	?	3	12
Dropsy - - -	146	349	218	225	131	133	59
Apoplexy and suddenly	47	30	48	55	49	59	81
Palsy and lethargy -	14	17	12	18	19	28	46
Old age, bedridden -	370	388	415	324	241	357	130
Casualties - -	65	76	85	70	40	57	77
Childbed and miscarriages - -	80	100	43	47	32	43	19
Chrisomes, overlaid, convulsions, worms, teething, mold-shot head, dropsy on the head, inflammation of brain, rickets, liver-grown, canker, thrush, croup, hooping-cough - -	1681	1591	1827	1682	789	625	1314
Inflammation - -	?	?	10	31	101	307	
Unknown causes -	?	?	?	?	?	88	
Other diseases -	253	565	211	144	146	289	
All causes - -	5000	8000	5200	5000	2920	3200	2488

golden age of the vaccino-phobists,—we find a *scrofulous death-rate more than five times as great as our present*

* That death-rate of 8 per cent., the average for London during the twenty years succeeding the Restoration, may have been in Mr. Macaulay's mind when he criticised in his history (end of Chapter III) the delusion "which leads men "to over-rate the happiness of preceding generations." "It is now (he says) the "fashion to place the golden age of England in times when noblemen were

one. And then trying by a different process to estimate the former fatality of phthisis—examining, namely, for the three periods compared what deaths have been attributed to diseases of the respiratory organs—we find that, even with the utmost amplification of this list (including pneumonia, which formerly may have been counted to "fever," and including respiratory affections of infancy, which would formerly have been counted to "chrisomes," and including similar affections of advanced life which would formerly have been counted to "old age") still the *pulmonary death-rate of the present time is seven per cent. lower than the pulmonary death-rate of* 1746–55. Dr. Farr's conclusions quite confirm the tendency of Dr. Greenhow's evidence; and he remarks, as the general result of his inquiry, that "the "proportion of persons "destroyed by consumption with "other forms of scrofula, has (except in the anomalous "period 1771–80) progressively declined in London."

Circumstantial inquiry in particular cases fatal to M. Carnot's theory.

As regards more detailed statistical inquiries — such, namely, as depend on the minute examination of particular cases—it may be observed that there has never been adduced a tittle of evidence to show that vaccinated individuals suffer more than non-vaccinated individuals from any ail-

"destitute of comforts, the want of which would be intolerable to a modern "footman; when farmers and shopkeepers breakfasted on loaves the very sight "of which would raise a riot in a modern workhouse; when men died faster in "the purest country air than they now die in the most pestilential lanes of our "towns, and *when men died faster in the lanes of our towns than they now die on "the coast of Guiana.*" According to M. Carnot there ought to have been very little natural small-pox in those days. What say our diarists of London life? In the pages of Pepys and Evelyn there are many references to small-pox; from 1660—when "in the midst of all this joy and jubilee, the Duke of Gloucester "died of it in the prime of youth, and a prince of extraordinary promise"—to January 1695, when (the disease having already raged for two months, and the queen having died of it) "the deaths by small-pox increased to five hundred "more than in the preceding week;" and perhaps the strongest expression occurs in the very middle of that period when other diseases were so fatal. In 1668 (Feb. 9) Pepys writes, "and among other things, if I have not already "set it down, it hardly ever was remembered for such a season for the small-"pox as these last two months have been; people being seen all up and down "the streets newly come out after the small.pox." It was in 1685 that Evelyn related, "in bitterness of sorrow and reluctancy of a tender parent," the loss of his own daughter by the disease.

ment whatsoever. On the contrary, where such inquiries have been made, they have distinctly refuted the supposition.*

As soon as M. Carnot's assertions were made public—as soon as he had committed himself to a statement† that typhoid fever was to be considered as the vaccinational substitute for small-pox, there was something definite for the physicians of France to investigate. They proceeded to do so. They did not shelter themselves under any general arguments. They did not confine themselves to saying to M. Carnot, that where he had found a new disease there was really but a new name. They did not superciliously refer him to common text-books of medicine from which he might learn, what were the ravages of typhoid fever —

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* In the year 1814 Mr. Macgregor, then Surgeon to the Royal Military Asylum at Chelsea, published (Med. Chi. Transact. Vol. v.) an account of observations which he had made in that establishment during the ten preceding years in order to ascertain "whether measles, hooping cough, and scarlet fever had been more "fatal and severe in the children, male and female, that had undergone vacci- "nation, than in those that had been subjected to the casual or inoculated small- "pox." Of children in the latter category there had been 1550; among whom had occurred 420 cases of measles, hooping cough, and scarlet fever, leading to 19 deaths. Of children in the former category there had been 891; among whom there had been 239 cases of the same diseases, leading to 9 deaths. The fatality of these diseases, then, to such as they attacked, was 1 in 22 among the variolated class; 1 in $26\frac{1}{2}$ among the vaccinated class; so that what difference existed was in favour of the latter.

† In this doctrine M. Carnot has found two adherents, whose works require no distinctive notice; viz., M. Ancelon, who has written "des transformations des fièvres essentielles dont le cowpox est la cause," and M. Bayard, who has communicated similar crudities to the Academy of Sciences. The following passage from the *Comptes Rendus* of this body (Feb. 10, 1851) may be conveniently quoted, as expressing in a succinct form those doctrines of which my text shows the refutation:—"M. Bayard, dans cette nouvelle note, présente une série de "propositions se rattachant toutes plus ou moins directement à cette idée déjà "soutenue par lui dans ses précédentes communications, que la maladie désignée "sous le nom de fièvre typhoïde n'est qu'une variole interne attaquant les "individus que la vaccine a préservé, dans leur jeune âge, de la variole avec "éruption externe. De ces douze nouvelles propositions, nous nous contenterons "de reproduire les deux suivantes. XI. La variole confluente et la fièvre "typhoïde ne sont, très probablement, qu'une seule et même maladie, externe "dans un cas, interne dans l'autre, produite par la combinaison du typhus et de "la variole. XII. L'inoculation du virus varioleux dans l'enfance préserve le "sujet inoculé des complications, souvent mortelles, dues à la combinaison de la "variole avec les causes morbides intercurrentes."

under other names—long before the discovery of vaccination. But with a candour and humility which did them honour, they accepted the medical hint of their arithmetical opponent, and set to work on the subject. And with what result? Why, that as fast as facts could be collected, the facts refuted him; that the typhoid infection was observed not only to pay no special regard to the unvaccinated, but even to attack persons in the very hour of their emergence from small-pox; that, conversely, small-pox would attack others in their actual convalescence from typhoid fever; that to have had the one disease, or to have escaped it, made absolutely no difference to having the other disease or escaping it; susceptibility to the one infection standing in no discoverable relation towards susceptibility to the other; and vaccination having no more to do with typhoid fever than with any other casualty of life which befalls vaccinated and unvaccinated alike.*

Summary of results of detailed investigation.

Apart from those demonstrations, a second great series of facts, observed for the last fifty years, is conclusive against M. Carnot's imagination. When masses of vaccinated persons are exposed to the infection of small-pox, if some of them suffer, do they suffer typhoid fever or any intestinal ulceration, inflammation, or disturbance? Here is exactly M. Carnot's postulate, small-pox infection acting on the vaccinated body; and the result is among the most extensively and most accurately observed phenomena of clinical medicine. In it there is the utmost possible refutation of M. Carnot. On his showing, there should be typhoid fever. In fact, there is nothing like it. Under the happy influence of Jenner's discovery, the small-pox is mitigated, perhaps almost to nothing. A few pustules, rapidly drying up, may alone attest that the once dreadful enemy is working in vain against a protected body. Of typhoid fever, of intestinal complication, of any other like disturbance, there is literally not a trace. But, just in proportion as the pustules are few, just in proportion as the protectedness against small-

Second class of facts fatal to M. Carnot's theory. What happens when vaccinated persons are exposed to variolous infection?

* *See Note* VII., p. 313 : Indifference of Typhoid Fever to difference between Variolated and Vaccinated persons.

pox has been all but complete, so—in diametrical contrast to M. Carnot's notion—the other sufferings of the patient will be slight, and his convalescence rapid.

Sanitary experience of the real causes of typhoid fever.

It may further be observed, that investigations made in this country have established among the certainties of medicine that typhoid fever mainly depends on causes quite remote from the causes of small-pox. And in respect of those districts or institutions in France where this disease is said to decimate the inhabitants, I will venture to affirm, as confidently as if I had visited the localities, that any qualified person inquiring into the *diet and atmosphere* of such populations, especially into their drinking-water, drainage, and domestic arrangements for cleanliness and ventilation, would be able readily to explain from local circumstances, and almost as readily to obviate by local improvements, any such specific mortality as M. Carnot alleges to exist.

Scrofulous affections.

As regards the second class of diseases to which special reference has been made—the scrofulous or tubercular class—the pathological argument is at least equally applicable. The causes of such diseases are radically different from the causes of small-pox. To talk of such diseases being the vaccinational varieties or introversions of small-pox—to talk of their promising to be developed in proportion as small-pox becomes suppressed—is simply to talk at random.

What is meant by scrofula.

There are two senses in which the word "*scrofulous*" is used in pathology: first (somewhat indefinitely) in reference to such sub-acute and chronic *inflammations*, often of an ulcerative kind, as are apt to arise with little or no exterior provocation in various textures of feeble and ill-nourished persons; secondly and more strictly, as appropriate to the specific constitutional fault which in certain persons disposes certain organs to suffer *tubercular* disease.

Scrofula without tubercles.

"Scrofula" in the first-mentioned sense is not independent of hereditary influences, but its principal causes have to do with the mere keeping and feeding of the individual

Its real causes.

sufferer. Scientific experiments have been made to imitate it in the brute creation; and unintentional experiments on millions of mankind have shown, on an awful scale how

naturally it associates itself with insufficiency of nourishment, with exhausting toil, with care and grief, with squalid cheerless circumstances of life, and with other like influences; how large an element it therefore is among the diseases of the poor, and often of the imprisoned; how habitually it is but the sequel and index of pre-existing depression of health. To say then of "scrofula," when the word is used in the above sense, that the practice of vaccination has tended to increase its prevalence, is to allege against vaccination a charge which would seem peculiarly inapplicable. If you compare the degree in which natural small-pox weakens and exhausts those whom it refrains from killing, with the contrary and entire absence of such results among the ordinary effects of vaccination, you have in this comparison a measure of the important influence which Jenner's discovery has exerted, not in aggravating, but in mitigating, the prevalence of such "scrofula" as is here meant.

Vaccination a powerful indirect influence against it.

Almost the same may be said of "scrofula" in that second-mentioned and more definite sense in which the tendency to pulmonary consumption and to other tubercular affections is meant. Scrofula in this sense is eminently apt to be hereditary. In persons who have inherited the tendency, some circumstances will very much favour, while other circumstances will very much disfavour, the actual manifestation of tubercles; but the tendency itself, the root of the disease, is in no immediate dependence on exterior conditions. It lies in those laws of development under which the chemical changes of the body, like its growth of stature and of features, are made conformable to a particular parental type; it belongs to the likeness between parent and child; it forms part of the family entail; and so little does it stand in any apparent connexion with vaccination, that on the contrary, it even shows marked preference for those very periods of life, when the protective influence of infantine vaccination has often partially become obliterated. What then do those writers mean who talk of tubercular diseases being made more frequent by vaccination? They can hardly mean that vaccination propagates from one person to another the developmental peculiarity which I have described; for

Scrofula with tubercles. Phthisis.

Its real causes.

this would be almost as if they said that vaccination could determine the future length of the legs, or the future shape of the nose. If on the other hand they mean, that, where the tendency to tubercular disease has been inherited, vaccination is a circumstance to favour, and small-pox a circumstance to disfavour, the actual manifestation of tubercles, then, again I would say, only let them read the history of small-pox. Among recognized developing conditions of "tubercular affections" just as among the causes of the "scrofulous inflammations" previously spoken of, impoverishing and depressing influences hold, by common consent, the most considerable place;* and, so far as we know, it is only as an impoverishing and depressing influence that either small-pox or vaccination can be imagined to operate,

Vaccination indirectly preventive of tubercular, as of non-tubercular, scrofula.†

Thus, in short, in whichever of its two senses the word "scrofula" be used, all writers on small-pox attest the frequency with which "scrofulous" affections follow in the train of small-pox; and in such measure as vaccination is less

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* Monsieur d'Espine, of Geneva, has attempted to measure, with some degree of statistic precision, the influence of poverty in producing certain diseases. He says:—"Les décès par vice scrofuleux forment le $\frac{21}{1000}$ des décès déterminés "dans la mortalité générale, le $\frac{6}{1000}$ des décès des riches, et le $\frac{34}{1000}$ des décès "des pauvres. La prédisposition scrofuleuse chez les pauvres est ici aussi "frappante que l'influence préservatrice de l'aisance. Les décès par vice tuber- "culeux entrent pour les $\frac{155}{1000}$ dans les décès déterminés de la mortalité générale, "tandis que chez les riches il n'y a que 68 décès pour 1,000 qui se rapportent "aux tubercules; chez les pauvres, on en compte 233 pour 1,000. Ici encore "on trouve une influence très prédisposante de la misère et une action préser- "vatrice de l'aisance."—Annales d'Hygiène Publique, t. xxxviii.

† It deserves notice, that this indirect *prevention of scrofulous affections* was among Jenner's hopes when he announced the discovery of vaccination. In various passages of his writings (e. g. op. cit. pp. 60, 116, 181) he refers to the notorious frequency with which such affections were excited by small pox; and he appeals to general consent as to inoculated small-pox often occasioning them. "In constitutions predisposed to scrofula, how frequently we see the inoculated "small-pox rouse into activity that distressful malady. . . . Every practitioner "in medicine who has extensively inoculated with the small-pox, or who has "attended many of those who have had the distemper in the natural way, must "acknowledge that he has frequently seen scrofulous affections, in some form or "other, sometimes rather quickly, showing themselves after the recovery of the "patients." It is worth while to remember that these charges were brought against the practice of small-pox inoculation long before the discovery of vaccination; and not only amid the frantic prejudices against its first introduction but even to the end of the century, when certainly its dangers in this respect must have been greatly diminished by the improved methods of treating inoculated

impoverishing and less depressing than small-pox, in just such measure should we expect that its substitution for small-pox would act, not in extension, but in prevention, of scrofula.

Summary of results on the morbid liabilities of vaccinated persons.

So far, then, as regards properly-performed vaccination, there is absolutely no reason to believe or suspect that, in rendering persons less liable to contract small-pox, it renders them eventually more liable to contract other diseases. Neither in speculative pathology, nor in common practice, is there the slightest semblance of support for any such doctrine. It ranks with the old misgiving, that vaccination would make horns grow and cover the body with cow-hair. Those who would have believed the one may believe the other.

What does vaccination really do to the human body?

Is properly-performed vaccination, then, an absolutely inoffensive proceeding? No, nor does it pretend to be so. Its very intention is, that it shall artificially produce a transient and trifling indisposition; that for some days the infant shall be uncomfortable with a sore arm and a slight irritation of the adjacent axillary glands, and a perceptible amount of general feverishness. Within the limits of this description, one child may be a little more, another a little less, inconvenienced: but those limits are rarely exceeded. And if it cannot strictly be said that the immediate effects of well-performed vaccination never exceed the intentions of the vaccinator, at least it may be affirmed that any permanent injury resulting from it is an accident barely known in the practice of surgery.

Does vaccination cause cutaneous eruptions and glandular swellings?

Persons hostile to vaccination allege against it, that it produces eruptions on the skin and glandular swellings: and

patients. In a pamphlet written between 1793 and 1798 earnestly in defence of inoculation (Advice to Parents on the Management of their Children in the Natural Small-pox and during Inoculation; Newark and London, n. d., p. 3) I find the following passage:—"The propriety of inoculation is confirmed as well "by reason as experience; and though some unfavourable circumstances have "happened in the hands of ignorant and illiterate persons; though repeated "eruptions have given rise to the false report of patients having the disease a "second time; though the *vis vitæ* of some whose constitutions were not very "strong, and the proper medicines through a want of skill not duly proportioned, "has been injured; though persons with weak lungs have been thrown into "pulmonic complaints; yet these contingencies are by no means to be charged "to the method itself."

others, not unfavourable to the practice, doubt whether this may not to some extent (and especially as regards unhealthily-predisposed scrofulous children) be a true allegation. Vaccination might afford to bear these imputations. For, to what do they amount? Were they ever so true, the alleged evil—even to the sufferer—would be little in comparison with his gain; and the total amount of such evils, compared to the social advantages of vaccination, would, literally speaking, be too small to appreciate.

Circumstances under which these disorders occur.

But, in fact, the imputation is, at least generally, erroneous. It generally expresses the common fallacy, *propter quia post*: that whatever ailment has happened to come after vaccination is too hastily judged to be its effect. An infant is commonly vaccinated at three or four months of age: thus whatever physical or moral evils belong to human life are very likely to have been preceded by vaccination; and it would be wonderful if ignorant persons did not often ascribe to the operation a very undue share of responsibility for those evils. When you consider, too, that the few months after vaccination include events which are very critical to infant life, you will see what frequent room there must be for misconception. Even to the healthiest and best cared for of children, weaning and teething are not perfectly safe and comfortable processes; to delicate and ill-nurtured children they are often fatal; to vast numbers they occasion, sometimes during many months, distressing or alarming symptoms. Such symptoms, I need hardly tell you, affect both vaccinated and unvaccinated. They have been known as incidental to infancy from periods long anterior to Jenner's existence. Now, an extremely frequent one of such symptons is an inflammation of skin (known by the technical name of *eczema infantile*) producing on the child's head and face, or on other—perhaps many or most—parts of the body a dense eruption of little pimples, which presently convert into an itching and discharging surface so much of the skin as they occupy: and since irritations of the skin are peculiarly apt to propagate themselves in the direction of the return-current of the circulation of blood to the so-called lymphatic or absorbent

glands which are subsidiary to this circulation, so it very commonly happens that more or less irritation and swelling of those glands will accompany that eczematous eruption; and that, for instance, the child who has the eruption about its head and face (which are among the most usual seats of the unsightly disease) will often be still further disfigured by glandular swellings in the neck. Though I have spoken of this infantile complaint as incident to the time of teething and weaning, yet in fact it may arise at earlier periods of life—even within a few weeks of birth—and of course before vaccination as well as after it. Indeed, frequently it is a reason for which vaccination is postponed; and perhaps I can give you no readier means of estimating how little vaccination has to do with its occurrence, than by telling you, first, that before the discovery of vaccination small-pox inoculation was charged with producing it; and, secondly, that in 1714, when even small-pox inoculation was yet unknown in England, Dr. Daniel Turner* expressed himself in the following terms:—"Among diseases of infants and young "children scarce any attends more frequently than pustulary "or scabby eruptions in several parts of their bodies, as "in the breech, but more especially their foreheads, brows, "and other parts of the face, which we find oftentimes over-"run with dry and crusty scabs."

Their relation, direct and indirect, to vaccination.

The circumstances under which both infantile eczema and glandular swellings arise are familiarly known to the medical profession. To say that properly-performed vaccination can have *directly* to do with them—that it can directly cause general eczema, or directly affect any glands but those which it is intended and expected to affect—would be an assertion not warranted either by practical experience or by any pathological probability. To say that *indirectly* it may do so—that, in the very few instances where it produces excessive results, the disturbance thus occasioned may, by depressing or fevering the child, temporarily assist or excite other causes of disturbance—that, under such very exceptional circumstances, it may for the

* Treatise on Diseases of the Skin, p. 44, where the references given by Turner extend back to Galen.

time of its operation dispose the child to this complaint and to that, may excite the scrofulous child to show its scrofula, and the eczematous child to show its eczema—these are assertions which may or may not be true; which are more easily made than either established or refuted; but which, if admitted in their utmost scope, really allege against vaccination nothing which might not as practically be alleged against a cold in the head, a cut finger, an undigested meal, or any other one of the thousand minor accidents of every-day life.

So much for what has been alleged against properly-performed vaccination—against such vaccination as alone ought to prevail in any country where the State requires its performance. So much for the natural drawbacks which have falsely been said to detract from its inestimable advantages, and the dangers which with almost equal falsehood have been said to attend its performance.

Ill-performed vaccination.

II. It is less easy and less necessary to dispose of what may be said against ill-performed vaccination; understanding in this phrase not merely such vaccination as is done with an unskilful hand—(for commonly the worst effect of clumsiness is only that the operation fails)—but especially referring to such vaccination as is done without due inquiry into *the health of the child* to be vaccinated, or without due care for *the quality of lymph* to be employed.

Extreme necessity for carefulness in vaccination;

If local scandals have arisen against vaccination, and if some prejudices against it seem to have in them a show of reason, those are the sources from which such serious evils have come. All that belongs to the mere manual trick of vaccination is learnt from a minute's teaching and an hour's practice; but not so easily the philosophy of the procedure, or the precautions which are requisite to make it harmless and useful. From Jenner onward, all great masters of vaccination have urged that its merits will always appear proportionate to the merits of its performers; that if sickly children are vaccinated without due regard to their actual condition of health—children breeding other disorders—children having skin-disease—children teething—and the

like; or if children, healthy or unhealthy, are vaccinated with improper material, the results must be at least unsatisfactory, and possibly dangerous. And all competent persons accordingly recognize that one who would vaccinate must thoroughly study these things.

especially as to choice of lymph.

Especially as regards the quality of vaccine lymph, the careless or uneducated vaccinator is using a dangerous weapon. It is only during part of the course of a vaccine vesicle that its lymph is suitable for further vaccinations: for after a given moment, at which the contents of the vesicle possess the maximum of simple contagiousness, they tend more and more towards the quality of common inflammatory products; and matter now taken from the vesicle is no longer the simple agent of a specific infection, but both has less efficiency for its real purpose, and is specially able to produce other undesired results. A danger of somewhat similar kind is that of taking lymph from vesicles which already have been accidentally ruptured, or where from any other cause—local or constitutional—their specific fluid is likely to have been modified by common irritative processes. Still more critical changes occur in lymph when removed from the body, unless appropriate means be taken to preserve it; for, under the influence of air and moisture, it tends, like other dead organic matter, to putrid decomposition; and inoculation with it, when thus changing, can hardly be more useful or less dangerous than a casual scratch inflicted in the dissecting room. According to the usual practice of vaccination, error is less likely to be committed in this particular than in the one first mentioned; for, when the operation is not performed from arm to arm, use is very generally made of lancets or ivory points, on which lymph has been allowed to dry. Under this system (at least in our climate) the matter is almost secure from change; and there is little room for such accidents as might arise from failure in those delicate procedures by which lymph is sometimes kept moist for use. But the danger of taking matter from irritated vesicles, and from vesicles at too advanced a period of their course, is one which circumstances render frequent; and there is reason

to believe that, in at least a very large proportion of those cases where abnormal effects have resulted from so-called vaccination, it has been the employment of this ambiguous irritative matter which has occasioned the mischief and scandal.

Can accidental infections occur in vaccination?

Suspicions are sometimes expressed that a slovenly vaccinator, careless in his choice of lymph, may thus communicate to one child the constitutional or local diseases of another. If this were true, it were nothing against vaccination. It is no argument against bread, that alum constipates the bowels; still less is it an argument against quinine, that some drunken shop-boy may give one strychnia instead of it..... A vaccinator must forget his duty in more than one particular—must be indifferent both to the feelings of others, and to the social progress of the great good which he claims to administer, if he affronts the natural antipathies of those who bring their children to be vaccinated, by drawing his lymph for vaccination from the vesicles of diseased subjects. And, practically speaking, I can conceive no circumstances in this country which would justify a departure from the rule—recognized by the medical profession as unreservedly as it is desired by the public—that lymph be taken only from healthy subjects.

Opportunity of testing it ought in fact never to occur.

But, supposing that, in breach of this rule, lymph be taken from the Jennerian vesicle on the arm of a subject suffering constitutional disease, what then? On the assumption that it be a true Jennerian vesicle at the proper period of its development, there are [1857] cogent reasons for believing that such vaccination will produce none but vaccine results..... It has been proved on a large scale that vaccine lymph, taken from persons actually suffering small-pox, conveys to those who are vaccinated with it no other than the vaccine infection.* .... The diseases which it has been

Vaccine lymph from persons suffering small-pox.

Maladies which are alleged to have been communicated by vaccination.

* This most remarkable truth has been established, I say, on a large scale; for, not once or twice, but at least hundreds of times, something to the following effect has occurred. A patient has been vaccinated a little too late for protection. He had previously been exposed to an atmosphere infected with small-pox. Warned of his danger, he has had recourse to vaccination when already small-pox was latent in his system; and (under a law which expresses the intimate affinity of these two agents) the operation of the inhaled variolous contagion, and the

suspected that vaccination might communicate have chiefly been scrofulous and syphilitic complaints, and various eruptions of the skin..... Of some among the diseases referred to, it may no doubt be admitted that their specific products are infectious; but then again comes the question, whether the constitutional existence of such diseases can specifically infect the contents, without modifying the characteristic development, of a true Jennerian vesicle.

Experiments on the subject.

Experiment, where it has been deliberately addressed to the solution of this question, has invariably answered *No;* and such experiment is worth more than many arguments. The early Reports* of the French Academy contain numerous

M. Taupin.

operation of the inoculated vaccine contagion, have proceeded simultaneously on his person; the former producing the general disturbance and general eruption of small-pox; the latter producing, at the vaccinated spots, characteristic Jennerian vesicles. And with the lymph of these vesicles, again and again, successful vaccination has been performed. Again and again it has been shown that such lymph is capable only of communicating the Jennerian infection.

* Rapports présentés à M. le Ministre de l'Intérieur par l'Académie Royale de Médecine sur les Vaccinations pratiquées en France. From four of these Reports I extract the following paragraphs:—(Rapport 1808–9., pp. 54, 55.) "M. Pellieux, médecin à Baugency, nous a paru avoir fait l'expérience la plus "concluante en inoculant le vaccin d'un sujet varioleux à vingt-trois sujets qui "ont eu simplement la vaccine. . . . Des sujets dartreux, galeux, teigneux, "vénérieux, scrofuleux, ont également fourni à quelques praticiens de la matière "vaccinale, dont l'inoculation a produit son effet ordinaire sans donner la "moindre marque de la maladie dont les enfans étaient attaqués." (Rapport 1821–22, p. 41.) "Quelques personnes peu éclairées répugnent encore à faire "vacciner leurs enfans parcequ'elles supposent que les maladies des individus "qui fournissent la matière, peuvent se transmettre par l'intermédiaire de la "vaccine aux sujects sur lesquels on l'inocule. Cette crainte, détruite dans nos "premières expériences et toujours combattue depuis cette époque, l'a été de "nouveau par plusieurs de nos correspondans. Ainsi M. Rochot, médecin à "Seurre, a vacciné dans un village du département de la Côte d'Or un enfant de "six mois, dont la mère était atteinte du mal vénérien, et qui lui même avait "quelques pustules au front. Il inocula le vaccin de cet enfant à plusieurs "autres sur lesquels la vaccine se développa sans aucune complication d'affection "syphilitique. M. Debar, médecin à Rue, a fait la même expérience, et avec le "même succès. M. Voisin, officier de santé à Solignac, a inoculé le vaccin d'un "sujet galeux sans donner la gale. Enfin, M. Labesque a inoculé quatre "personnes avec du vaccin provenant d'un sujet qui était en pleine suppuration "de petite vérole et la vaccine s'est développée seule." (Rapport 1829, p. 15.) "On sait depuis longtemps que le virus vaccin ne se charge d'aucun principe "contagieux. Cette année plusieurs médecins, parmi lesquels se trouve M. Boucher de Versailles, l'ont inoculé après l'avoir puisé chez des varioleux qui "avaient à la fois la variole et la vaccine, et n'ont donné que cette dernière "maladie." (Rapport 1834, p. 45.) Le virus vaccin ne communique et ne développe que la vaccine.

particulars on this interesting subject; but observations on the largest scale appear to have been made by M. Taupin during his residence as medical officer in the Paris Hospital for Sick Children; and Messieurs Blache and Guersant, Physician and Surgeon to this Institution, having occasion to discuss the general question, have included an account of M. Taupin's experiments in a passage which altogether is of so much importance that I transcribe it at length from their paper.* "Le virus vaccin ne paraît pas s'allier " avec d'autres virus: lorsqu'on inocule un mélange de virus " vaccin et de varioleux, on n'a qu'une de ces maladies, " ou, si elles se développent toutes les deux ensemble, elles " marchent chacune séparément avec le caractére qui lui " est propre. Dans un très-grand nombre d'expériences " tentée par le comité de vaccine ou par ses correspondants, " on a pris du vaccin sur des pustules vaccinales développées " à dessein au milieu de dartres, d'ulcères scrofuleux, de " teigne favus, de vésicules de gale: on n'a remarqué que " la vaccine sans aucun mélange de gale ou d'autres maladies. " De nombreuses expériences sur ce sujet ont été répétées " par la Docteur Taupin, à l'Hôpital des Enfants Malades. " Nous empruntons ce qui suit à un mémoire inédit sur la " vaccine, et qu'il a eu l'obligeance de nous communiquer. " Pendant les quatre années qu'il a passées à cet hôpital, " il a sous les yeux des chefs de service vacciné plus de " deux mille sujets placés dans des conditions différentes " d'âge, de santé, &c.; il a suivi et noté avec soin le résultat " de l'inoculation, et il s'est surtout attaché à observer quelle " modification les diverses maladies pouvaient faire éprouver " à la vaccine, et quelle influence celle-ci pouvait exercer " sur elles à son tour. Il a pu observer que le vaccin " recueilli chez des enfants atteints de maladies aiguës ou " chroniques, de fièvres essentielles, affection typhoïde, fièvres " éruptives, de phlegmasies thoraciques, cérébrales, abdomi- " nales, de névroses, telles que chorée, hystérie, épilepsie, &c., " était tout aussi actif que s'il eût été emprunté à des enfants " bien portants; qu'il donnait lieu à une vaccine tout aussi " abondante et regulière, et qui préservait tout aussi efficace-

* Dictionnaire de Médecine (seconde édition) art. *Vaccine.*

" ment de la variole ; et ce qu'il n'importait pas moins " d'établir par un nombre considérable d'observations, c'est " que le virus ne transmettait aucune maladie, soit aigue, soit " chronique, contagieuse ou non contagieuse. Un grand nombre " d'enfants atteints de gale, de scarlatine, de rougeole, de vari- " celle, de varioloïde et de variole, ont fourni un vaccin qui " n'a jamais communiqué aucune de ces maladies contagieuses. " Il en a été de même pour le vaccin pris sur des sujets atteints " de rachitis, de scrofules, de syphilis, de tubercules, d'éruptions " chroniques du cuir chevelu, de dartres, &c. Dans aucun " cas, nous y insistons à dessein, le virus n'a rien com- " muniqué que la vaccine toute seule. Loin de nous l'idée " de conclure de cette innocuité qu'on doive employer " indifféremment du vaccin pris sur des sujets sains ou " malades ; mais nous voulions rapporter ces faits bien avérés " pour faire justice de ce préjugé qui attribue à du vaccin " malsain les maladies qui surviennent quelquefois chez les " sujets vaccinés, longtemps même après l'inoculation." I am not aware of any counter experiments suggesting different conclusions to those which are expressed and justified in the preceding passage. They assert for vaccine lymph the principle which Dr. Mead a century ago asserted for the virus of small-pox inoculation:—"it is more material into " what kind of body it be infused, than out of what it be " taken."* Indeed in the whole list of diseases, syphilis is

* It deserves mention that these fears about the possible transfer of some unintended contagion belonged to the days of small-pox inoculation, and were then much discussed. In Kirkpatrick's Analysis of Inoculation, mention is made of a case where he tried, with no ill effect, the inoculation of small-pox matter from a syphilitic patient. Dr. Mead (Chap. 5) writes of those who, "infected " with an incurable itch of writing and taking great pleasure in contradicting " others to whom they bear envy, . . still go on to terrify us by saying that " there is danger lest, together with the small-pox, some other infection inherent " in the blood and humours of the sick person should be transmitted into the " sound body, . . and such perhaps are scofulous swellings and the venereal " disease. Yet I can hardly believe that it ever happens that the seed of one " distemper should bring along with it mixed the procreative matter of another " of a nature quite different from it. . . It is in my opinion more material " into what kind of body the venom be infused than out of what it be taken." It is remarkable, too, that the first opponent of vaccination (Moseley, op. cit. xi.) discusses this point—not in reference to vaccination (against which it had not then been raised) but in reference to small-pox inoculation:—"Suppose a " subject in the small-pox to have inveterate scurvy, scrofula, itch, syphilitic

the only one to which serious suspicion could attach; and, in regard to its communicability by the lymph of a true Jennerian vesicle, various other observers confirm the accuracy of M. Taupin's results.*

Experiments of Professor Sigmund and Dr. Friedinger.

Moreover Professor Sigmund, of Vienna (whose researches on everything relating to the inoculation of syphilis have been on a very large scale), has added to M. Taupin's results one, which, quite in a different manner, is equally against the possible invaccination of syphilis. In an official Report on the division of the Hospital over which he presides (Aerztlicher Bericht des Allgem. Krankenhauses; Wien, 1855) he relates experiments to show that syphilis in its inoculable form prevents, within the sphere of its infection, the simultaneous formation of a vaccine vesicle. The discharge of chancre (in which form alone syphilis is universally recognized to be inoculable) has been designedly mixed—as by nature it never could be mixed—with ordinary vaccine lymph; and the insertion of this compound poison in the skin has been followed only by the ordinary local results of syphilitic infection. No Jennerian vesicle has been formed; no signs have existed of any possible combination of the two infections. Dr. Friedinger, who conducted these important experiments in Professor Sigmund's wards, and under his observation, has also communicated their result to the Society of Surgeons at Vienna.†

" infection, or consumption, certainly no person ought to take matter from such " a person for inoculation. But it might be done with as much safety as if none " of these disorders were present. Peculiar circumstances, which I had no " share in creating, have rendered me acquainted with some of these facts, and " accident the others."

* Dr. Heymann (Henke's Zeitsch. 1856, p. 195) quotes some experiments by Dr. Schreier, of Ratisbon, which are to the same effect :—" Zwei in hohem Grade " syphilitische Kinder geimpft und aus den volkommen entwickelten Impfblattern " die klare Pockenlymphe auf gesunde Kinder übertragen, was nicht den " geringsten Nachtheil für die Geimpften zur Folge hatte;" and he gives some remarkable observations made by himself at Java. Children having scrofula, syphilis, itch, the endemic frambæsia, and other complaints, were used, indifferently with others, as sources of vaccine lymph; and no evidence ever appeared of any disease being thus communicated. This, he says, was especially observable in vaccination performed on the generally clean-skinned and constitutionally sound Chinese, from the Javans, who were so often the opposite.

† Abhandl. der Gesellschaft der Aerzte zu Wien. 1854–5.

Peculiar source of fallacy in cases of alleged invaccination of syphilis.

It is unquestionable, however, that cases are recorded in which the lookers-on (sometimes including a medical practitioner) have believed syphilis to have been communicated by vaccination. A moment's reflection suggests, that in such cases there must generally be sources of fallacy, which render them, in contrast with experimental results, almost valueless for instruction. When a child is born with the heritage of syphilis (a very frequent incident, if its parents have been suffering from that infection) the characteristic symptoms commonly do not appear till some weeks after birth; and then the scandal discloses itself. Now among persons with any sense of shame the knowledge that one had transmitted syphilis to one's child would always be a sore subject. There would be strong temptations to employ false pretexts. Not only would parents often conjointly wish to disguise from their medical attendant, or from members of their household, the real explanation of the child's ailment; but also, not infrequently, one parent would wish to conceal from the other that the origin of the disease had been a conjugal infidelity. In respect even of unmarried people, every surgeon knows what utterly false, far-fetched, and absurd explanations are given of syphilitic symptoms, primary and secondary; and it requires little experience to imagine how much more pertinacious will be the demand for excuses, and how much more active the supply of falsehood, under the complicated circumstances of connubial syphilis. Accordingly it is matter for surprise, that vaccination has not almost generally been pitched upon by persons in search of an apology for their syphilitic children. But in truth even such allegations against it have been few; and their paucity (assuming them all to have been made in good faith) would be a strong reason for regarding them with mistrust;* for surely

* Medical sources of fallacy are really too numerous for enumeration. But there is one against which, in my opinion, peculiar caution is required. I have personally reason to know that a simple surgical incision, on a child having latent in it the taint of hereditary syphilis, may become the seat of ulceration which will present the ordinary characters and require the specific treatment of a secondary syphilitic sore. Some years ago I performed on a little boy, having no apparent ill health, a very trifling surgical operation—that for phimosis. In

if syphilis could be diffused by the vaccine lymph of children with an hereditary taint of that disease, this possibility must long ago have been made evident on a scale far too considerable for question.*

Real cases of inoculation of syphilis in pretended vaccination have arisen in a different manner.

Among the scanty number of recorded cases in which such allegations have been made, there are, however, some, in which, so far as I can judge, it seems almost certain that a person pretending to vaccinate did really effect a syphilitic inoculation. Properly to estimate these grievous instances of malpractice, two considerations must be adverted to:—First, the already quoted negative results obtained by Taupin and many other observers in their experimental inoculations of lymph from the true Jennerian vesicles of syphilitic children; secondly, the fact that [so far as known in 1857] secondary syphilis itself is very possibly not communicable even by direct inoculation of matter from the ulcers and eruptions which it occasions; for many of the ablest experimenters in Europe declare, that in hundreds of trials they have never once succeeded in thus conveying from person to person the slightest infection of syphilis. And, regard being had to these considerations, it becomes almost certain, that in the cases referred to, the matter of chancres—the matter of primary syphilis—was used instead of vaccine lymph by the vaccinator; a mistake (however it may have occurred) of so gross and criminal a nature,

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a few days the incision was, as is usual, all but well. In a few more it had begun to ulcerate. For some weeks there continued in the part an indolent inflammatory process, with considerable swelling, and slow but progressive ulceration. A variety of treatment failed to do good. At length a suspicion occurred to my mind which led me to prescribe iodide of potassium. Within eight-and-forty hours the wound had thoroughly changed its character—every reason for alarm was gone; and within a few days complete healing was accomplished. I now learnt that the child had been born with a strong hereditary taint, and had—long before the operation—required constitutional treatment on account of the usual symptoms of infantine syphilis. . . . .

* Dr. Heim (op. cit. p. 613) observes that an universal infection (allgemeine Landesseuche) of scrofula must very long since have occurred if this disease could have been communicated by vaccination; and he adds, that perhaps it would not have been much better with the diffusion of secondary syphilis. Dr. Heim is among those who have experimented on the subject; and his results accorded with M. Taupin's conclusions as to the non-communicability of syphilis by the lymph of a Jennerian vesicle.

that the medical profession would feel no sympathy for the person through whose neglect or incompetence it happened.

[*I must not pass this last paragraph for re-print without expressly noting that its two arguments of thirty years ago have ceased to be valid.—First: with the better knowledge which M. Ricord supplied in* 1858 *by the publication of his discoveries relating to the syphilitic contagium, we learnt that the experiments which we had regarded as proving the incommunicability of secondary syphilis had been fallacious, and that secondary syphilis is essentially inoculable. Secondly, regarding the communicability of syphilis by means of vaccination: later knowledge has not led me at all to doubt the veracity of the negative evidence so largely quoted by me in* 1857, *as given by experimenters and practitioners down to that time; but in view of information acquired from* 1860 *onward, including particularly Professor Pacchiotti's publication of* 1862 *as to certain Italian outbreaks of syphilis, and some unquestionable similar experience had by our own country in* 1871, *it has now, for some years, been certain that, notwithstanding the generality of the negative evidence, vaccination from subjects with congenital or secondary syphilis is not invariably without power to propagate syphilis. As the purpose of my present note is only to draw attention to those two advances of knowledge in their immediate logical bearing on the last preceding passage of text, I need not here discuss their wider bearings: but I may state that, from the time when they were made, it of course was my duty always to have them in mind when advising on vaccination: and that whatever I had from time to time to say on the question of vaccinal syphilis will be found at later pages of the present volume—See, for* 1870, *my Twelfth Annual Report to the Privy Council; for* 1871, *my evidence before the House of Commons Select Committee on Vaccination; and for* 1872, *my contribution to the First Annual Report of the Local Government Board.*—J. S. 1887.]

Cases where small-pox matter has been unintentionally used in vaccination.

Other illustrations of culpable malpractice in vaccination, though rare, are not unknown. In the French Report (which has just reached us) on the vaccinations of 1854, mention is made of an outbreak of small-pox due to the unintentional employment of variolous matter—instead of vaccine lymph—for inoculation. And I have been informed that a grievous instance of the same kind, leading to not inconsiderable loss of life, recently occurred in this country. But in coming to cases of this description, there is no longer question of the merits of vaccination. If recorded instances of the kind, instead of being so few that you may count them on your fingers, were of innumerable frequency, they would make no argument against vaccination. Only they would, if possible, bring into stronger light than before,

the expediency and duty of providing that this great self-defence of nations against pestilence be not ignorantly and recklessly administered.

General result.

Here indeed is the whole gist of the matter. Earlier parts of this Letter have shown that by vaccination, properly administered, the once enormous fatality of small-pox may be reduced almost to nothing. The present section justifies a conclusion, that against this vast gain there is no necessary loss to count. Of the alleged natural drawbacks to the great advantages of vaccination, the present state of medical knowledge recognizes no single trace. Jenner's discovery, properly utilized, has been a pure blessing to mankind, an unmixed addition to the strength and happiness of nations. To say of vaccination that it has sometimes been ill administered—to say that, under pretext of its administration, harm has sometimes been given instead of good, poison instead of antidote, is to speak, not against it, but—whether rightly or wrongly—against its administrators. The vaccinations of Europe are now counted annually by millions. It may be vain to hope that every lancet shall be used with equal skill and equal carefulness, or that all populations shall be equally anxious to render those operations successful; but medicine at least has contributed her share, in showing that—subject to these conditions—small-pox needs cause no further fear, nor its antidote be accepted with mistrust.

V. Public Vaccination in England.

More than forty years had passed since the time when Jenner's discovery first became an accepted part of medical science. Throughout the continent of Europe arrangements more or less complete had long been made to render it of universal application. Its triumphs were everywhere recognized. During eight consecutive years in the Grand

Duchy of Baden, during thirteen consecutive years in the city of Copenhagen, there had been no single death from small-pox.

While foreign governments were thus fulfilling the aspirations of the English surgeon, and by vast economies of human life were realizing the new source of national strength which his genius had given to mankind, in Jenner's own country there was less progress to be traced.

Till 1840 no general provision was made.

National Vaccine Establishment.

The action of the British Legislature had been confined to subsidising by an annual grant (finally of 2000*l.*) the National Vaccine Institution. This establishment, directed *ex officio* by the annual heads of the London Colleges of Physicians and Surgeons, had, since the year 1808, fulfilled the indispensable object of maintaining and furnishing supplies of vaccine lymph; but it had never possessed either apparatus or authority for any general system of vaccination. Its labours as a vaccinating establishment were of little importance, except as subsidiary to the other and main object of its existence; for its vaccinations were confined to London, and even here, at their utmost, were but in small proportion to the requirements of the metropolis.*

Charity Vaccination.

Charitable institutions and the generous zeal of the medical profession did very much to diffuse the benefits of vaccination. But, with so great an interest at stake, this dependence on casual good will seemed an uncertain title to the desired possession, especially while it was "held that "an overseer was not bound to take measures to procure "the poor children of the parish to be vaccinated during "the prevalence of small-pox."†

The working of this negative system can be measured but imperfectly by statistical evidence; either as to the defect of vaccination, or as to the consequences therefrom resulting. For on the one hand, no account was kept of

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* The Annual Report of 1839 states, that in 1838 (when small-pox was severely epidemic) the establishment vaccinated 18,659 persons, being "6,241 "more than had been vaccinated in the metropolis and neighbourhood in any "former year," and more than double the present average of its vaccinations. The births in the metropolis in 1838 were about 55,000.

† The Vaccination Acts, by Danby P. Fry, Esq., page 20, note.

persons charitably vaccinated:* and on the other hand, till after 1837 (when general registration began in this country) there could be no authentic knowledge of deaths by small-pox. But, from the establishment of the General Register Office in 1837 to the abandonment of charity-vaccination in 1840, there exist accurate mortuary records; and from their results, as embodied in the Second and Third Reports of the Registrar-General, I learn that nearly 36,000 deaths by small-pox signalized those last three years of non-legislation. Further, an inquiry made into the ages of the victims of 1839 showed that three-fourths of their number were children under five years of age, who, in nearly every individual case, must have been unvaccinated; since death by post-vaccinal small-pox at that early period of life is almost an unknown occurrence.†

Large small-pox mortality of the years 1838–40.

Especially of unvaccinated children.

First provision for general public vaccination under optional system.

Seventeen years ago, the Legislature provided (3 & 4 Vict. c. 29) that vaccination at the public cost might be claimed

* The Recruiting Returns of the Army Medical Board for the years 1846–55 show that, among 136,113 recruits medically inspected and found fit for service, the marks of previous vaccination or small-pox were as in the annexed Table;

Number of Recruits.	Having Marks of Vaccination.	Having Marks of Small-pox.	Having no distinct Marks of either.
136,113 - - -	96,545	29,220	10,348
Rate per 1,000 -	709	215	76

or, in round numbers, that out of every 14 young men of the enlisting population, at least 3 had had small-pox, 10 had been vaccinated, and 1 had undergone neither small-pox nor vaccination. From this it may be inferred that at the birth time of these recruits (20–30 years ago) the vaccination of infants, as compared with the number of births, was very considerably under the proportions $\frac{7}{10}$; because the generation from which these recruits were survivors must have lost a disproportionate number of its unvaccinated, not only by small-pox (which would have affected them almost exclusively) but likewise by those infantine diseases which would have destroyed many before the age at which vaccination is performed.

† Dr. Gregory, in reference to the small-pox deaths of this period, speaks of them as having occurred "in great majority among infants and very young "children, not one of whom had probably ever been vaccinated." He says, "we have satisfactory evidence that under fifteen years of age the deaths by "small-pox after vaccination are scarcely noticeable."

of local authorities in every parish of England and Wales; and this enactment was followed by a further provision (necessary, because Poor Law guardians and overseers were to be the administrators of the law) that gratuitous vaccination should not place its recipient in the position of persons receiving parochial relief.

Small-pox during the years 1840–53.

This measure, after thirteen years experience of its working, was found insufficient for its purpose. There was improvement, indeed, so far as could be ascertained; for the small-pox death-rate during the three years 1838–40 had been 770 per million, and now was only 304; but the

Ages at Death of 9,085 fatal Cases of Small-pox.

At all Ages.		0–5.	5–10.	10–15.	15 and over.
England in 1847	4,227	3,114	527	111	475
London in 1848–52	4,858	3,265	659	154	780
Total	9,085	6,379	1,186	265	1,255

latter death-rate denoted for England more than 5,221 annual deaths, and of these, as before, the vast majority were infantine. A classification made, according to age, of 4,858 small-pox deaths which occurred in London during the five years 1848–52, and of 4,227 small-pox deaths which occurred in England in 1847, shows, as in the annexed table, that more than two-thirds were under five years of age, and that but a sixth of the number had completed ten years.

Continued high mortality of infants under optional system.

With the accurate knowledge already possessed on the protective powers of vaccination, the above facts could be interpreted in only one way. Putting aside all question of the older victims, and omitting all reference to the records of public vaccination, the observer of those facts could be quite certain that in England annually about 4,500 infants and children were dying by one specific parental neglect.

Continued indifference towards early vaccination.

And this certainty was made doubly certain by the annual statements of the Poor Law Board on the progress of public vaccination. During the five years 1848–52 the annual births in England had averaged 568,811; but the public vaccinations of infants under one year of age had averaged only 180,961. It was argued (and subsequent events have shown the argument to have been sound) that, if the Vaccination Extension Act had been working in a satisfactory manner the number of infantine vaccinations would have been double, if not triple, what it was. Indeed the same official statistics which showed the above-stated deficiency of infantine vaccination showed also that this neglect arose neither in reluctance to profit by the new institution of gratuitous vaccination, nor in prejudices against the thing itself, but mainly in men's passiveness of procrastination. For while the annual public vaccinations of infants under one year of age had averaged only 180,961, those at higher ages had averaged 185,139; in other words, public vaccinations were being performed to the amount of nearly two thirds the annual number of births; but with such indifference towards the object to be obtained, that not half of such vaccinations were performed within even the first year, and of course a much smaller proportion within the first six months, of life. No wonder that, with this carelessness on the subject, small-pox continued to be fatal to large numbers of the infantine population. And a further statistical analysis of the material I have already quoted shows, that while more than two thirds of all deaths by small-pox were happening under five years of age, deaths in the first year of life made more than a third of this proportion.

1853. First establishment of compulsory system.

Under these circumstances, some improvement in the law was evidently required; and in 1853 such improvement was partially effected by an Act (16 & 17 Vict. c. 100.) to "Extend and make compulsory the Practice of Vaccination." This law, which has now been in force nearly four years, makes it an obligation on parents and guardians that every child (its health permitting) shall be vaccinated within, at

furthest, four months from birth. It also attaches a penalty to non-compliance with this enactment, and provides that Registrars of Births (who are to keep record of all vaccinations under the Act) shall at the registration of each birth give to the persons concerned a printed notice of their legal obligation.

Principle of the law.

This was indeed a very important measure. Infantine vaccination was at length recognized at its full value. Henceforth it was to be counted among those conditions, necessary for the maintenance of life, which a parent should not be entitled to withhold (any more than food or clothing) from his offspring.

To what extent was it an interference with private rights?

Persons, unacquainted with the circumstances under which this law was made, have doubted whether it was not an improper restriction of personal freedom. It being assumed as the limitary principle of human law, that men may be left free to follow every inclination which relates only to themselves, it would certainly at first blush seem foreign to the province of legislation to insist on a man's caring for his own health; and if his having small-pox could affect none but himself, little would need to be said against his right of having it *ad libitum*. The fact, however, is, that the man who indulges a preference for small-pox, does so to the detriment or danger of his neighbours; and in view of their liability to suffer by his infection, they may reasonably claim to be heard on that question of his privilege. But be that as it may, the aim of the obligatory law, as I understand it, is not to prevent adults from cherishing in their own persons, if they be so minded, their individual liability to natural small-pox; its object is to prevent them from compelling (since in this case *allowing* amounts to *compelling*) their children to incur that peril. The interference of the law is an interference between parent and child; a kind of interference very sparingly exercised in this country, and the exercise of which on slight grounds would of course be intolerable. The practical justification of any such law depends on the amount of evil which it is designed to correct; and four or five thousand annual deaths

by one specific parental omission constituted in this case a strong argument. It was under pressure of this appeal, that the Compulsory Vaccination Act was passed. The option which the new law restricted was not that of a conscious agent deliberately preferring for himself the dangers of small-pox to the securities of vaccination. The thousands who annually died of non-vaccination had never raised their voices for the privilege of unrestricted small-pox. The so-called "liberty" thenceforth to be abridged was that of exposing unconscious infants to become the prey of a fatal and mutilative disease. It was this liberty of omissional infanticide which the law took courage to check. It seems to me that persons most careful for true liberty might, on the alleged grounds, be most urgent to provide for the compulsory vaccination of infants: and I believe that the general sense of the public concurred with the conclusion of the Legislature, that here was one of the many occasions on which, for common good, individual crotchets ought to give way.

Doubts might have been felt as to its practical working.

Yet let me confess for myself, that, if I had had occasion four years ago to express an opinion on this subject, I should very greatly (and, the result shows, very wrongly) have feared the operation of such a measure. Not for a moment, indeed, should I have doubted the moral right of the Legislature to interfere—if it could successfully interfere—with that ignorant or wicked negligence which was killing so many thousands of helpless children: but I should have dreaded lest another evil might result from the enactment of a compulsory law. Believing that vaccination is, beyond all comparison, the greatest practical good with which medical science has enriched us, I should have felt the utmost apprehension lest, by association with penal provisions, it might perhaps become unpopular; lest this apparently unnatural combination should excite resistance or suspicion; lest the public should in any degree mistrust a gift which the law would compel them to accept.

Such doubts have been solved.

In fairness towards others who perhaps still entertain these doubts, I frankly confess to you that four years ago, they

would have been my own; but I am now most glad to be able to show that such alarms would have been unnecessary. Experience has already disposed of them. Partly from the English habit of respecting every actual law, and partly no doubt because the justice of this particular one was recognized, the Act for compulsory vaccination was obeyed with alacrity. And many arguments on the subject may be saved by a simple perusal of the annexed table. The first line of

	Annual Public Vaccinations.		Annual Births.
	Under One Year of Age.	Over One Year of Age.	
Average of the five years 1848–52 - - -	180,960	185,139	568,811
1854 - - -	408,824	290,111	623,699
1855 - - - -	354,979	109,120	623,181
1856 - - -	350,847	84,165	640,840

figures gives the average (to which I have already referred) of births and of public vaccinations during the years 1848–52; and you will observe that while the births in England were 568,811, the infantine vaccinations were only 180,960. In 1853 the law was altered. In 1854 you find the infantine vaccinations considerably more than doubled. From 180,960 they had risen to 408,824. And not only this. The indirect action of the law had extended to induce what it could not compel; and vaccinations at ages after the first year of life had likewise been increased by more than 100,000 cases. Thus in 1854, under the immediate influence of the new law, the total public vaccinations of England at all ages exceeded by more than 75,000 the total number of births; the large majority of 290,111 cases in the third column consisting no doubt of young children, whose vaccination under the former defective system had been indefinitely delayed.

Immediate very large increase of infantine vaccination.

The table shows a further important fact. In the line for 1855 and in that for 1856 you will notice again a

Subsequent decline in this increase.

decline in the number of vaccinations; not alone in the third column (where a decline from 290,111, to 109,120, and again from 109,120 to 84,165, might mean only that the first year of activity had so far cleared off existing arrears in the category as to leave but few non-vaccinated children to appear afterwards) but also in the second column; where a decline from 408,824, to 354,979, and from 354,979 to 350,847, infantine vaccinations can only denote that the *stimulus which was given to early vaccination by the new law in the first year of its working, became in the second year less effective than in the first, and in the third less effective than in the second.*

Meaning of the secondary decline in the number of infantine vaccinations.

The explanation is simple. At the first passing of the law people hastened to obey—because they feared to disobey—its imperative provisions. The possibility of a summons and of a fine was before them. This, which would not have conquered any resolute objection, was just enough to stir that mere indifference which among uneducated persons is the main obstacle to universal infantine vaccination. The law commanded *and threatened*; so it must be obeyed. Thus, in the first year: but it was soon discovered that the threat was an empty one, that it could not be fulfilled, that the law had provided no machinery for its execution. And then forthwith obedience began to decline in the proportion which those figures express.

Defect in the Act of Parliament.

In short it is a radical defect in the Act, considered in its compulsory relations, that the duty of warning defaulters, and the discretionary power of proceeding against them, are assigned to no local officer or local authority, and that consequently the compulsory provision of the law rapidly tends to be regarded as a dead letter.*

Progressive diminution of small-pox has followed the successive improvements of the law.

Still it is impossible to overlook that great good has been done. It would be premature to say much on the influence against small-pox which the new law must already have exerted; for conclusions in medical statistics take long to

* See *Note* VIII., p. 315 : Early Working of the Compulsory Vaccination Act.

ripen, and here we have only two years' experience to record. Yet I may beg you to read the annexed table, as showing

Periods compared.	Annual Deaths by Small-pox in England and Wales.	Annual Rate per Million of the Population.
Average of three years 1838–40 - - -	11,944	770
Average of nine* of the years 1841–53 -	5,221	304
1854 - - -	2,808	149
1855 - - -	2,525	132

* N.B.—During the four years 1843-6 causes of death were not distinguished in the reports of the Registrar-General.

that diminutions in small-pox mortality have hitherto kept pace with improvements in the law. The first line of this table expresses the high mortality which belonged to the last three years of the period of *charity vaccination*. Its second line expresses the greatly reduced mortality which belonged to the period of *optional vaccination*. Its third and fourth lines express the very much smaller mortality which has attended the system of *compulsory vaccination* during the two years of its adoption. If such figures are insufficient to sustain a pathological argument, they are at least enough greatly to encourage the Legislature to further improvements of the law.

Further improvements are required.

Precaution to be taken against any too peremptory working of the law.

And such improvements are indubitably called for. First, in order to fulfil those objects which are expressed in the title of the last Act, "To extend and make compulsory "the Practice of Vaccination," it is requisite to amend that defect which I have named. Yet, while for the recited purpose, it is indispensable that the law should be rendered quite stringent and workable, it seems to me scarcely less important that it should never be worked in an oppressive dogmatical manner, and that appeal to its penal provisions should as rarely as possible be made. Against any abuse there would be given, I think, the amplest security which the nature of the case admits, if the power of summoning

offenders before a magistrate could be exercised only under direction of the Local Board. With the threat of this power in the distance—with the knowledge that in cases of obstinate disobedience it could really be invoked and really become operative—I believe that such cases would not exist; that practically the *compulsion* of the law would consist in the fact of a local officer sending his reminder to persons in default; for that this reminder (itself exceptional) would almost invariably produce an immediate compliance with the law.

Provision is required for more uniform good quality of vaccination.

I have said that the compulsory enactment of 1853 *partially* effected the desired amelioration of the law. It was, however, no trifling part which remained for improvement. And not only does it still remain; but indeed the very change which was made has rendered still more imperative the necessity for a further and completing reform.

For surely no principle can be more obvious than this:—that if the State professes to vaccinate the people—above all, if it compels the people to be vaccinated—it must take every possible security for the excellence of the vaccination which it offers.

The Legislature has hitherto not recognised that there is such a thing as bad vaccination. And indeed, in large part, vaccination is certainly good; otherwise small-pox could not, within half a century, have been, as it has been, rendered comparatively infrequent and innocuous. Yet, that there is current in England and Wales not only an appreciable amount of utterly incompetent vaccination, but a very considerable proportion of second-rate vaccination, is quite certain.

Mr. Marson's evidence as to the excess of bad vaccination, and as to its consequences.

I know of no person so qualified to speak on this subject as Mr. Marson; who for more than twenty years has resided as surgeon in the Small-pox Hospital of London, and has continuously applied himself to record the results of non-vaccination and of sham vaccination.

I have already quoted this gentleman's very important observation, that if vaccinated persons happen to contract small-pox, the mortality among the best-vaccinated of the

number is but one-thirtieth part of the mortality among the ill-vaccinated. And as regards the large and lamentable preponderance of the latter class, Mr. Marson's Papers (see page 19) will show you that of 3,094 vaccinated persons whom he has seen suffering with small-pox, only 268 presented what he considered the marks of thorough vaccination. Mr. Marson insists on "evils, more especially "affecting the humbler classes, connected with the circum-"stances under which vaccinations in country districts are "performed;" and further, his opportunities having enabled him to judge of the vaccinations of other kingdoms of Europe, he assigns even a very low relative rank to the performances of England; observing, that "there can be no "justifiable reason why the rural inhabitants of England "and Wales should be, as he knows them to be, far less "well vaccinated than are the rural inhabitants of Denmark, "Sweden, and Prussia."

And—besides the terribly large proportion of patients, nominally vaccinated, whose vaccination, because of unskilfulness, has been but of partial effect—there are other cases "of frequent occurrence at the Small-pox Hospital," where patients are in the category of non-vaccinated persons, simply because bungling operators have failed to vaccinate them. "With good lymph, and the observance of all pro-"per precautions (says Mr. Marson) an expert vaccinator "should not fail in his attempts to vaccinate above once "in 150 times; yet a large number of those, who take "upon themselves the duty think they do very well if they "succeed, however imperfectly, five times out of six: and "patients often present themselves with small-pox at the "hospital, who state they have been cut five, six, eight "times, or more, for cow-pox without effect."

Local prejudices against vaccination often testify to the same effect.

Far less precise than Mr. Marson's experience, but in its own way equally deserving of consideration, there is other evidence which raises great doubts as to the quality of much current English vaccination. Among the so-called prejudices against the practice, there are some which represent a partial truth; erring indeed only in so far as they

impute generally to vaccination what they should have imputed exclusively to the vaccinator. Considerable disturbance of health has often followed—sometimes to a dangerous and even fatal extent—the improper acts of persons pretending to vaccinate. If all operators equally had been impressed with the necessity of following Jenner's short and simple teaching; if all equally had inquired into the state of health of children they were about to vaccinate, and had stayed proceeding till any temporary ailment had been removed; if all equally had been careful as to the condition of children from whom lymph has been taken; if all equally had been content to study the natural progress of the Jennerian vesicle, and the different qualities of material which it furnishes at successive stages, or under accidental disturbances, of its course; if, in short, all equally had recognized that vaccination is not a mere easy trick of the fingers, that it requires to be done, and that its results require to be followed, with the observant eye of an educated special experience;—if, I say, the substance of this had been in the minds of all who have pretended to vaccinate, little, very little, would have been heard of prejudices against that matchless discovery. A local prejudice against vaccination would, in my judgment, be a reason for inquiring into the skill with which, in the prejudiced locality, vaccination has been administered; whereupon I should not be surprised to hear of some individual case in which nominal vaccination has either proved useless as a protection against small-pox, or has occasioned unexpected suffering to the child; and the inquiry, if pressed further, would probably show that the origin of this scandal has either been (on the first supposition) one of those imperfect vaccinations against which Mr. Marson protests, or (on the other supposition) some incompetence or neglect relating to the selection of lymph, or the due preparation of the patient. When I reflect how entirely the local repute of vaccination may be affected by one or two cases of this description, and at the same time remember our present absolute insecurity against their very frequent occurrence, I feel very strongly convinced that vaccination has not had a reason-

able chance of becoming popular in this country. "It should be remembered" (says Mr. Marson in his Petition to the House of Commons) "that no authorized system of vaccination has been established in England. All persons—medical men, clergymen, amateurs, druggists, old women, midwives, &c.—are allowed to vaccinate in any way he or she may think proper, and the persons operated on are considered to have been vaccinated." It is certain that the non-medical male and female vaccinators to whom Mr. Marson refers must often have brought scandal on the practice, and that many persons have met their deaths by small-pox under the false security of such unskilful vaccination. The present law requires under penalty that the infant (its health permitting) shall be taken for vaccination to "some duly qualified medical practitioner," who shall afterwards certify the results of his proceeding. It is probable that under working of this provision the number of amateur vaccinations has considerably decreased; but obviously the intention of the law remains liable to be frustrated, while vaccination can with impunity be attempted by persons who cannot even legally, much less competently, give any certificate as to its results.

Miscellaneous practitioners of vaccination.

Probably diminished under existing law.

To what extent vaccination has been unskilfully performed by persons purporting to be members of the medical profession, and to what extent (within a much narrower circle) it has been unskilfully performed by persons possessing legal credentials of their qualifications to practise surgery, are questions which I cannot answer.

As regards the system of public vaccination in this country, it is principally in the hands of the Poor Law Medical Officers of England and Wales; and I cannot refer to these gentlemen without begging you to understand, that some remarks which I shall directly offer on that system are not intended as a criticism on the staff by which so many of its advantages are dispensed. Indeed I am reluctant to leave unexpressed the very deep respect which I feel for their often ill-requited labours. Among them there are men—not a few—whose lives are continuous acts of unrecorded self-devotion; whose disinterested goodness conduces, equally with the achieve-

Public vaccination chiefly by Poor Law medical officers.

ments of our great masters, to ennoble the medical profession. And looking to the whole body, and to its whole ministrations, I will venture to say, that no other walk of human life can show a larger proportion of skill, education, and conscientious industry, than is given by these officers—too frequently under circumstances of non-appreciation and discouragement—to the daily and nightly comfort of their suffering fellow creatures. It is for the interest of this meritorious body of men (not less than of the public) that in a system which they chiefly contribute to work, competence and incompetence should not be confounded together; especially, that all future admissions to the number of public vaccinators should be of persons fully qualified for the duties they venture to undertake.

Absence of provision for general study of vaccination.

Under present system a public vaccinator may be appointed who has in no degree studied vaccination.

Appointment must be of "legally qualified medical practitioner:"

And this brings me to the point at which I am obliged to mention one serious defect in reference to my present subject—the absence, namely, of proper provision for the general study of vaccination. While the law provides a specific machinery for public vaccination, offering it gratuitously to all persons; and still more, while the use of this very machinery is in fact, for at least two-thirds of the population, not optional but compulsory; so long, I have ventured to assert, it is a moral obligation on the State, that what it thus invites and compels people to accept shall be of at least good quality. It was the intention and, I humbly think, a wise intention of the Legislature, that the responsibility of choosing the most efficient person for each appointment as public vaccinator should be vested in local authorities, subject only to the limitation that none but "legally qualified medical practitioners" should be contracted with for the purpose. It was naturally believed that under this limitation every needful security was taken for the uniform appointment of persons possessing familiarity with the practice of vaccination. About two dozen varieties of medical practitioners attest the utter incoherence and insufficiency of our laws relating to the medical profession; and no one, so far as I am aware, has hitherto succeeded in defining what, among these, is a "legally qualified medical "practitioner" in the sense of the law referred to. But,

defined or undefined, that term does not give the security which it surely was the intention of the Legislature to take. There is (I feel some shame in confessing it) *no general test of medical proficiency which implies a knowledge of vaccination.* Nor, so far as I know, have we *any medical school where vaccination is systematically and practically taught.* The young man who formally undergoes the now almost superseded apprenticeship to an apothecary, or who in any other capacity resides during his pupilage with a medical practitioner (especially if that practitioner be in the Poor Law medical service) will generally have had fair opportunities of learning to vaccinate. But this case is far, very far, from being universal; and as regards other students of medicine, I can offer no opinion on the source whence their knowledge is to come. There may be examinations of which I have never heard. There may be schools of which the particulars are not before me. Therefore I will not venture to affirm that no candidate at the College of Surgeons has ever been asked a question on vaccination, or that no medical school in England and Wales teaches the practice of vaccination. But the truth would not be very remote from these assertions. And the point which is of real importance for my present argument is, that a medical student may pass through an industrious and creditable pupilage—may obtain his diploma, license and degree, as physician, surgeon, apothecary, and doctor—may become, in every possible sense of the word, a "legally qualified " medical practitioner"—may be eligible and actually elected for the appointment of public vaccinator—and meanwhile may never have performed, perhaps even never have witnessed, one single act of vaccination. In future modifications of the law these circumstances will require to be considered. It seems a necessary complement to what has already been enacted, that candidates for the appointment of public vaccinator should give evidence of having learnt to vaccinate, and that public facilities should exist for the practical study of vaccination.

but a "legally qualified medical practitioner" may never have seen a vaccination.

Administrative arrangements for the supply of public vaccination cannot properly be considered a merely secre-

Arrangements for national vaccination are

matter of medical science.

tarial affair. What has to be administered is not a mechanical matter of routine and registration; but a system which from beginning to end, and from centre to circumference, requires in all its parts to be vitalized by the *science of medicine.* Only thus, as it seems to me, can that security be given, which the public has a right to demand, for the uniform excellence of public vaccination. Only thus can local prejudices against vaccination be successfully and permanently resisted. Only thus can the thing itself be rendered the unqualified blessing which it ought to be.

Necessary conditions for efficiency of the system.

And it seems to me that arrangements for these ends can only be expressed in some such conditions as the following:—(1) in the special qualification of public vaccinators; (2) in systematic medical supervision of the results of public vaccination; (3) in thorough medical inquiry whenever cause of complaint is alleged or suspected; and (4) in the regulation of details of the service on a uniform plan under the advice of members of the medical profession specially skilled in the subject.

Proposed transfer of superintendence of vaccination to the Health Department of the Government.

Grounds for this proposal.

The accomplishment of these objects was aimed at in that proposed transfer of the superintendence of vaccination to the Board of Health, which was the chief feature of last year's Bill, introduced by the President of this Board, and the President of the Poor Law Board. It was believed by both Boards that the transfer of this important branch of medical administration to that department which has specially to concern itself with medical subjects would conduce to the public service. It was believed that this department (permanently employing a medical officer) would be better able than the Poor Law Board (which has no medical element in its constitution) to give the requisite supervision to the results of public vaccination, and to direct by a medical inspector those inquiries which outbreaks of small-pox, or complaints of mal-vaccination, or other circumstances, might render necessary. It was further believed that the constitution of the Board of Health, while enabling it more easily than the Poor Law Board to effect

de die in diem these acts of supervision, would also give peculiar facilities for a still more important action. It was believed that, by using in the interests of vaccination its powers of appointing a Medical Council, the Board of Health could obtain, in a public and recognized manner, the advice—not only of those eminent functionaries of the Colleges of Physicians and Surgeons who at present, as an annual board, direct the distribution of lymph from the National Vaccine Establishment—but also of other persons, whose special labours in regard of small-pox and vaccination qualify them to be advisers of the Government and guides of the medical profession in whatever relates to the subject. It was believed that under such advice the Board might, with great advantage to the public service, *bring into one system the arrangements for public vaccination and the hitherto separate arrangements for the supply of vaccine lymph*;* might *fix conditions of qualification for the future appointment of public vaccinators*; might thus *indirectly promote among medical students the general and thorough study of vaccination*; might *provide that certain large vaccinating stations should become self-supporting schools of practical instruction*; and might *issue regulations of detail for many matters in public vaccination* which at present (not desirably for their object) are left to personal option, or regulated on non-medical grounds.

Especially as to objects which could be attained only after special medical consultation.

The necessity for some such organization as I describe has long been obvious to the medical profession; and important suggestions on this subject were addressed two years ago to Sir B. Hall, then President of this Board, by the President and Council of the Epidemiological Society

Memorial of Epidemiological Society on administrative arrangements for vaccination.

* Obviously these are natural parts of one system; and their present separation in England threatens a serious inconvenience. The first establishment of parochial vaccinations in 1840 had already much reduced the vaccinations of the National Vaccine Board, and the Compulsory Vaccination Act effected a still larger reduction. While its vaccinations have thus greatly diminished, and are liable to further diminution, the demands on it for supplies of lymph have increased, and tend constantly to become larger. Reference to the table at page 177 of the Appendix shows in detail what has been the operation of the last-named Act:—the annual average of vaccinations has fallen from 10,713 to 8,207; while, from this greatly reduced number of arms, the supply of charges of lymph has increased from 211,404 to 220,293.

of London. From the high professional character of the gentlemen whose opinions were expressed in this memorial, it was entitled to have much weight; the more so, as the Epidemiological Society had given special investigation to the subject, and had acquired intimate knowledge of the existing defects of public vaccination. Although the memorial cannot be considered as a paper written in direct reference to my present object (having indeed been addressed to the Board before I had the honour of being its officer) yet it was of so much importance in drawing the attention of the Government to those insufficiencies of administration which you now seek to remedy, that I have inserted it among the documents of my Appendix. Important criticisms on the plan advocated by the Epidemiological Society, and generally on legislation in reference to the present subject, are contained in Mr. Rumsey's learned and thoughtful "Essays on State Medicine;" London, 1856.

Importance of a due recognition by Local authorities of the exertions which are requisite to ensure really successful results.

Finally, with respect to the present system of public vaccination in England, it remains to be remarked, that local vaccination can never be reasonably good, unless Local Authorities estimate the operation at its due importance. I scarcely know any surgical operation in which the result is so much determined by attention to minute particulars; scarcely any which so specially requires not to be done mechanically and *per* contract. If steam-power or clockwork were applied to the purposes of surgery, it would perhaps be as easy by machinery to amputate as to vaccinate; not because vaccination is a thing of difficult handiwork, but because peculiarly it is a thing for painstaking judgment in its details. If the local successes of vaccination are to be considerable, the public vaccinator must very often incur trouble for which there is no language in his legal contracts. Not rarely he must be content to postpone a vaccination; not very rarely he must repeat one, sometimes again and again. Always he has to watch the results and (as he is paid only for successful cases) to report them with strictness. Timing his vaccinations so as to keep up a continuous succession is in itself no easy task. Kindly consideration for people's feelings, often a little coaxing,

sometimes a little authority, always a good deal of discretion, are—if he is to reach his utmost utility—as necessary to him as his lancet. How easily in all these particulars, and many more, might a vaccinator, bound only by his legal contract, escape an infinity of trouble with no ostensible fault! And unless he be fastidious in his choice of lymph, he had better not vaccinate at all; yet the difference between routine lymph and eligible lymph is to him a doubling of his labour. These are matters which can be but imperfectly known to local authorities, and which have, I dare say, seldom been considered in reference to the price to be paid for public vaccinations. Boards of Guardians in making arrangements for public vaccination in their several districts have perhaps not sufficiently regarded another peculiarity of the case: when they contract for bread and cheese, they can themselves verify the fulfilment of the bargain, and pronounce on the quality of supply: when they contract for public vaccination, they can only rely on the honour of their contractor. It is therefore indispensable to the success of public vaccination that local authorities should duly estimate the amount of skill and conscientiousness to which they thus unreservedly trust; and that hoping to find zeal and science enlisted in their service, they should not fix their standard of payment below that which the common opinion of the medical profession would consider a reasonable and remunerating price.

Recent correspondence on the subject of the preceding letter.

In concluding this Letter, I refer but very briefly to that valuable mass of information (App. J and K) which the liberality of foreign Governments and the kindness of distinguished members of my profession enable me to lay before you.* I venture to believe, Sir, that you will share the sense of obligation with which I refer to these large contributions of national and professional experience. Communications so important will best speak for themselves. Any attempt to give an abstract of their contents might end in

* See *Note* IX., p. 316 : Mention of some additional sources of information.

frittering away their value; and the respect which I feel for so remarkable a collection of independent testimony leads me greatly to desire that it should be read in the words of its authors.

Circular of questions addressed to members of the medical profession, to departments of the public service, and to foreign governments.

Therefore it is that I append scrupulously *in extenso* the replies which I have received to my Circular of Questions. Throughout the preceding pages I have in no case referred to such of them (J) as are personal, and but very rarely to those (K) which are official. Accordingly, you may consider the answers as representing so many additional witnesses hitherto, almost without exception, unexamined; and you will judge whether their testimony confirms or invalidates that which I have compiled from other sources, or stated as my own conviction.

My four questions are as follow:—

I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of small-pox, and almost absolute security against death by that disease?

II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of small-pox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?

III. Have you any reason to believe or suspect that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?

IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?

Answers to the first question.

The answers to the first question are of fundamental importance, and will repay careful perusal. Not only those which come from foreign Governments, and of which the gist is already before you in compact masses of national statistics; but also the 542 personal answers, which show as it were, fragment by fragment, the material out of which such statistics are compiled. To me these appear specially interesting, because it is by opinions of this kind, much

more than by columns of figures, that common life is influenced; and the information here collected shows the sort of knowledge of vaccination which is operative throughout Europe on all except the utterly uneducated classes. My question was purposely constructed in such a form as to elicit the expression of every existing doubt on the protective influence of vaccination; and the answers represent, I believe, quite fairly what would have been written by the medical profession if my inquiry had been a hundredfold as extensive as it was. You will observe that, throughout the whole series of 542 respondents there are but 2 whose opinion is negative. One of these gentlemen (No. 508) distrusts vaccination, and "would gladly inoculate his own "children with the small-pox;" the other (No. 219) regards both proceedings with equal disfavour, and considers them alike to be at best but harmless trifling. With these exceptions (against which I do not think it requisite here* to argue) every writer expresses confidence in the practice.

That small-pox may exceptionally occur after even apparently excellent vaccination, is of course made evident in these answers as in the previous statistics; but, in the detail of the answers, perhaps better than in the condensation of the statistics, you are able to see how mild a disease small-pox under such circumstances commonly becomes; and you will be struck with the large number of persons who, with great opportunities of observation—sometimes expressly mentioned as having extended over thirty and forty, even fifty and more years, have never seen a single vaccinated person die of small-pox.

One writer only has taken the trouble of stating at length the grounds of his confidence. But this one is Dr. Alison of Edinburgh; whose name commands respect in the medical profession, among hundreds who have profited by his personal teaching, and among thousands who have gathered instruction from his pen. In a paper supplemental to his answers (No. 10) he reviews both the

* In the margin of Dr. Hamernik's paper, I have taken the liberty of inserting an occasional note at points where he appears to me to have overlooked essential features of the case.

earlier and the later evidence on the subject of vaccine protection, and states his estimate of the argument in terms which must meet almost universal concurrence:—"The "question whether successful vaccination gives security to "a great majority of mankind against any attack of small-"pox in future life, and to a much greater majority against "fatal small-pox, has been generally regarded in this "country for the last half-century as practically decided "in the affirmative;....and, since the date of the papers "which were held decisive of the question fifty years "ago, there has been quite sufficient evidence collected to "show that the same inference is still inevitable, and that "he who disputes it is equally unreasonable as he who "opposes in like manner any proposition in Euclid."

Dr. Seaton, to whose zealous and valuable labours in the cause of vaccination I have already had occasion to refer, contributes a paper (No. 421) of important supplementary evidence: bringing into relief, unfortunately by contrast, the possible blessings of vaccination; and going no farther than to Scotland and Ireland for illustrations, that—in the absence of this protection—small-pox is still the same deadly and mutilative disease that it was.

Answers to the second question.

Answers to my second question are virtually included in answers to the fourth. Most of the replying Governments have made vaccination compulsory within their dominions; it is therefore superfluous to say that they at least have discovered no drawbacks to its advantage — no vicarious diseases to set against the extinction of small-pox.

So likewise among the 542 personal respondents, not a single one gives the smallest semblance of support to those contra-vaccinal doctrines which I have discussed. Very, very rarely are they even referred to. When I venture to say that M. Carnot's patchwork of figures gives an untrue picture of life, and that M. Verdé de Lisle's presumption and ignorance disentitle him to consideration, I am in the almost solitary position of having felt it a duty to read their writings. I can appeal to few witnesses who have gone through similar fatigue. An occasional German (for those indefatigable scholars read everything on their subject) and

an occasional Frenchman (for the scientific world of France has lately been molested with our old experience of foolish pamphlets) may be found mentioning those doctrines, only to condemn them. A single eminent English pathologist (No. 28) refers to them at my request in a special note. Otherwise they are unmentioned, because they are almost universally unknown. You need as little expect to find Sir Benjamin Brodie arguing against them, as Sir John Herschel against the prophecies of Zadkiel.

Indirectly the question is illustrated by an interesting series of papers (171, 179, 215, 222, 243, 391, 456) communicated by gentlemen in medical charge of schools. Especially the paper on Christ's Hospital, London, which I owe to the kindness of Mr. Stone, is important, from the largeness of its material. It gives for more than a century the mortuary statistics of an establishment which has contained from five to eight hundred young inmates; and you will notice that in this little population, just as in nations of which the statistics are before you, small-pox has gone without giving place to new diseases; that in the half-century 1801–50, while only one death from small-pox had occurred, the annual death-rate from other diseases had fallen from 847 to 585.

Answers to the third question.

With regard to the possible mischief of bad vaccination, there is somewhat less uniformity of tone; partly, perhaps, because of the real difficulty of the subject; but chiefly, because in answering the third question more expression has been given to speculative opinions. A few respondents (apparently on theoretical grounds) think that a vaccinator who improperly derives his lymph from an impure source may thereby invaccinate some second and unintended specific infection. A very few even believe they have seen instances of the kind. But, generally speaking, opinion and experience declare themselves in the opposite sense, and render it in the highest degree probable that, in the isolated instances to which reference is made, there may have operated those sources of fallacy to which I have adverted. Not only the very much greater volume of statement, but a really immense

weight of authority, is on the side of those experimental results which I quoted to you. Men of the largest and oldest consulting practice in the United Kingdom—men who are believed to have seen every variety of disease and accident to which the human body is liable—our leaders who have taught medicine and surgery to the mass of the profession—physicians and surgeons of our largest metropolitan and provincial hospitals in England, Scotland, and Ireland—physicians who have specially studied the diseases of infancy—surgeons who have specially studied the inoculative diseases—pathologists of distinguished insight and learning—have never in their experience "had reason to believe or "suspect" an opposite conclusion to that of M. Taupin's experiments. In the alphabetical series of opinions you will read familiar British names, dozen by dozen, standing beside assertions of this kind. You will read that equally negative in Paris has been the vast experience of Chomel and Moreau and Rayer and Ricord and Rostan and Velpeau; equally negative at Vienna, that of Hebra, Oppolzer and Sigmund. Obviously, then, one at least of two conclusions is inevitable. Either it is the case that, even with reprehensible carelessness as to the source of lymph, vaccination (so long as in the medical sense of the word it is vaccination) cannot be the means of communicating any second infection. [*See* however, the note introduced at page 275. J. S. 1887.] Or else it is the case that, in the world of vaccinators, care is almost universally taken to exclude that possibility of danger. To the public perhaps it matters little which of these conclusions is true. Analogies and experiments, as I have shown, speak almost decidedly for the former. But at least there can be no objection to superfluous precaution. And, in reading the answers written by gentlemen personally engaged in vaccination, you will be glad to observe how many of them, in referring to a possible slovenliness in this matter, speak of it as something which cannot be conceived of any decent medical practitioner.

Answers to the fourth question.

Answers to my fourth and last question are, for all practical purposes, summaries of opinion on the whole sub-

ject. For no person—you may be sure—will recommend the universal practice of vaccination, while he doubts its protective influence; nor while (like M. Verdé de Lisle) he regards small-pox as a "sublime crisis," which it is requisite for human health to undergo; nor while he considers that the success of vaccination, in extinguishing that horrible distemper, must develop other varieties of untimely death; nor even while he believes that, in its ordinary practice by competent persons, there are risks of casually inoculating other combined infections. To recommend that, except for special reasons in individual cases, vaccination (skilful, of course) shall be universally practised, is to imply that one's mind is made up on all those subjects. And such, you will observe, is the recommendation—with only two personal exceptions, the unanimous recommendation—of every individual and every Government in the series.

Wonderful unanimity of the answers.

Looking, then, to the whole succession of answers, and describing in few words what to myself has been the effect of perusing them, I would say that—above all—I am struck with their concord. Two hundred and thirty years have elapsed, since Harvey first taught the circulation of the blood: the first announcement of Jenner's discovery was but within the adult memory of men who are still living: yet questions addressed to the Governments of Europe, and to 542 professors and practitioners of medicine with respect to the older truth, basis though it has long become of all physiological teaching, could hardly elicit more unanimous replies than these which record the triumphant successes of vaccination. It can be no common certainty which commands so general an assent. It can have been neither a truthless nor a barren doctrine, which, within sixty years from its rise, has all but universally satisfied private judgment, and has converted nations to be its grateful followers.

Inevitability of some dissent.

No truth can be thought of, against which some one does not rail. And it would be idle to hope, under existing conditions of the human mind, that vaccination should be much more generally credited than it is. Perhaps in no age of the world, proportionately to its instruction, have persons been

readier than now to accept physical marvels, and to modify their conception of natural laws, at the cajoling of quacks and conjurers. It goes with this credulity to be incredulous of proven truth. Alike in rejecting what is known, and in believing what is preposterous, the rights of private foolishness assert themselves. It is but the same impotence of judgment, which shrinks from embracing what is real, and lavishes itself upon clouds of fiction. To some extent, therefore, it may be felt a weary and unprofitable work to have spent time and labour in re-asserting proofs which, fifty years ago, were exhaustive of the subject; and many eminent men who have favoured me with their assistance may grudge to have given it against superannuated error.

Their interest as a conclusive estimate of Jenner's services to mankind.

Yet if, in final acknowledgment of this assistance, I may be permitted to express what—far better than any thanks of mine—may requite those respected contributors for the trouble they have incurred, I would say that they have given to Jenner the monument which, beyond any other, he would have prized. They have made it easy to estimate the full measure of gratitude which is due to the discoverer of vaccination. They have displayed as actual experience, what it formerly must have seemed mere enthusiasm to foretell. You will read it in the skilled evidence of individuals who, solely with the resources of Jenner's antidote, are maintaining day by day against the most dreadful of infections the victory which he commenced. You will read it in the colossal statistics of nations which, till sixty years ago, were still decimated by that one messenger of death.

If utility to human life be any test of what is noble in labour, if our teacher of inductive philosophy have rightly advised us—*non tantum veritati et ordini, verum etiam usui et commodis hominum consulere*, then assuredly the discovery of which those things are told may rank with any achievement of man. "LET MEN REJOICE THAT THERE HAS SHONE SO GREAT A SPLENDOR FROM AMID THEIR RACE" is the bidding which, at Newton's tomb, reminds us of our immortal debt to the greatest Interpreter of Nature, and claims kindred for us with the power of his intellect, passionless and "almost divine." If corresponding honour be due to

the beneficent applications of science, if our mortal state owes love to those who have lessened its weakness and its misery, surely in Jenner has been a second student of nature, who, matchless as Newton in career, might have claimed to lie beside that monarch of the intellect in his last repose, and to share the inadequate homage of that grateful epitaph. For, though a different, it is an equal praise, which the members of Jenner's profession vindicate for his honoured name. He too interpreted nature: but, above all, he rendered her teaching fruitful. To arm mankind against the worst of pestilences, to widen by his one discovery the horizon of human life, to banish a cruel terror from every mother's heart,—such were Jenner's aspirations in his study of nature,—such have been the fruits of his philosophy.

Members of his profession esteem it their noblest vocation to imitate the endeavours which led him to this transcendent result; and I believe that they—whose contributions to the following pages I respectfully lay before you—will have felt an almost filial pride in expressing their knowledge of facts which consecrate Jenner's place in history.

I have the honour to be, Sir,
Your obedient servant,
JOHN SIMON.

Whitehall, May 9th, 1857.

CONTINUATION OF NOTES.

NOTE I.—RAVAGES OF SMALL-POX AMONG AMERICAN INDIANS.

Mr. Lloyd, the translator of Prince Maximilian's Travels in the interior of North America, quotes in the preface to his work the following description of an epidemic of small-pox which befel the Indians twenty years ago, adding that the general correctness of the details had been confirmed to him by several travellers who had subsequently visited those nations :—"The disease first "broke out about the 15th of June, 1837, in the village of Mandans, a few "miles below the American fort Leavenworth, from which it spread in all "directions with unexampled fury. The character of the disease was as appalling "as the rapidity of the propagation. Among the remotest tribes of the "Assiniboins from 50 to 100 died daily. The patient, when first seized, com-"plains of dreadful pains in the head and back, and in a few hours he is dead; "the body immediately turns black, and swells to thrice its natural size. In "vain were hospitals fitted up in Fort Union, and the whole stock of "medicines exhausted. For many weeks together our workmen did nothing "but collect the dead bodies and bury them in large pits; but since the ground "is frozen we are obliged to throw them into the river. The ravages of the "disorder were the most frightful among the Mandans, where it first broke out. "That once powerful tribe which, by accumulated disasters, had already been "reduced to 1,500 souls, was exterminated, with the exception of thirty persons. "Their neighbours, the Big-bellied Indians and the Ricarees, were out on a "hunting excursion at the time of the breaking out of the disorder, so that it "did not reach them till a month later; yet half the tribe was already "destroyed on the 1st of October and the disease continued to spread. Very "few of those who were attacked recovered their health; but when they saw "all their relations buried, and the pestilence still raging with unabated fury "among the remainder of their countrymen, life became a burden to them, and "they put an end to their wretched existence, either with their knives and "muskets, or by precipitating themselves from the summit of the rock near "their settlement. The prairie all around is a vast field of death, covered with "unburied corpses, and spreading for miles pestilence and infection. The Big-"bellied Indians and the Ricarees, lately amounting to 4,000 souls, were reduced "to less than the half. The Assiniboins, 9,000 in number, roaming over a "hunting territory to the north of the Missouri as far as the trading posts of "the Hudson's Bay Company, are, in the literal sense of the expression, nearly "exterminated. They, as well as the Crows and Blackfeet, endeavoured to fly "in all directions, but the disease everywhere pursued them. At last every "feeling of mutual compassion and tenderness seems to have disappeared, "Every one avoided the others. Women and children wandered about the "prairie seeking for a scanty subsistence. The accounts of the situation of the "Blackfeet are awful. The inmates of above 1,000 of their tents are already "swept away. They are the bravest and most crafty of all the Indians, "dangerous and implacable to their enemies, but faithful and kind to their "friends. But very lately we apprehended that a terrible war with them was "at hand, and that they would unite the whole of their remaining strength "against the whites. Every day brought accounts of new armaments, and of a "loudly expressed spirit of vengeance towards the whites, but the small-pox "cast them down, the brave as well as the feeble, and those who were once "seized by this infection never recovered. It is affirmed that several bands of

" warriors who were on their march to attack the fort, all perished by the way,
" so that not one survived to convey the intelligence to their tribe. Thus, in
" the course of a few weeks, their strength and their courage were broken, and
" nothing was to be heard but the frightful wailings of death in their camp,
" Every thought of war was dispelled, and the few that are left are as humble
" as famished dogs. No language can picture the scene of desolation which the
" country presents. In whatever direction we go, we see nothing but melancholy
" wrecks of human life. The tents are still standing on every hill, but no rising
" smoke announces the presence of human beings, and no sounds but the
" croaking of the raven and the howling of the wolf interrupt the fearful silence.
" The above accounts do not complete the terrible intelligence we receive.
" There is scarcely a doubt that the pestilence will spread to the tribes in and
" beyond the Rocky Mountains, as well as to the Indians in the direction of
" Santa Fé and Mexico. It seems to be irrevocably written in the book of fate,
" that the race of red men shall be wholly extirpated in the land in which they
" ruled the undisputed masters till the rapacity of the whites brought to their
" shores the murderous fire-arms, the enervating ardent spirits, and the all-
" destructive pestilence of the small-pox. According to the most recent accounts,
" the number of Indians who have been swept away by the small-pox, on the
" western frontier of the United States, amounts to more than 60,000."

NOTE II.—VACCINIA AS A MODIFICATION OF SMALL-POX.

On the researches which have tended to prove the variolous origin of cow-pox, see Heim (who gives an account of Gassner's inquiry and of the local circumstances which nearly deprived him of credit in the matter) in Henke's Zeitschr., Ergänzungsheft xxx. p. 57; Thiele, loc. infra cit.; Ceely, in Transactions of the Provincial Medical and Surgical Association, vol. viii.; Badcock. Detail of Experiments proving the Identity of Cow-pox and Small-pox: Brighton, 1845; also Boston (U.S.) Daily Advertiser, April 14, 1852, where it is stated that Dr. Adams, of Waltham, and Dr. Putnam, of Boston, by a successful repetition of Mr. Ceely's experiments, have been able to " furnish the " city and neighbourhood with all the vaccine matter used there since that " period;" further, with respect to a different and probably less successful method of variolating the cow, Sunderland, in Hufeland's Journal, 1830. In the above quoted volume of the Trans. Provinc. Med. Surg. Ass. (p. 24) Dr. McMichael is referred to as having in 1828 informed the College of Physicians that in Egypt, on occasion of a failure in the ordinary supply of vaccine lymph, the variolous inoculation of cows was successfully practised, and " fine active vaccine virus produced."

Dr. Thiele's paper is published in the first part, for 1839, of Henke's Zeitschrift für die Staatsarzneikunde, with an editorial note, dated December 1838. At that time the vaccine contagion, which he had originated by small-pox inoculation of the cow, had passed through 75 successive human descents, and had been used for vaccinating more than 3,000 persons. I transcribe the paragraph in which Dr. Thiele states his conclusions; and I add to it a further remarkable passage, in which he describes what he believed to be effectual means—independent of the cow—for *artificially reducing small-pox virus* to a state in which its inoculation would produce on the human subject only the ordinary effects of vaccination :—

" 1. Die sogennante Vaccine ist nicht eine den Kühen e genthümliche, sondern
" durch Uebertragung der Menschenpocken bei ihnen hervorgebrachte Krank-
" heit; und der Mensch und nicht die Kuh, wie man bisher geglaubt, ist die
" Quelle der Vaccine.

"2. Diese so gebildete Krankheit kann durch unmittelbare Uebertragung von "Kühen auf Menschen übergehen, bringt in ihnen eine identische leichte, vor "den natürlichen Blattern schützende, Krankheit hervor.

"3. Durch ein absichtliches methodisches Modificiren und Depotenziren, kann "man auch ohne Daswischenkunft der Kuh, Schutzblattern hervorbringen.

"4. Diese Schutzblatter hat alle bekannte Eigenschaften der Vaccine, nur in einem zum Wohle der Menschheit höheren Grade.

"5. Die vorstehenden, bis jetzt erlangten Resultate berechtigen zu der "Hoffnung, dass man zur Milderung der epidemisch-contagiösen Krankheiten "ein den Schutzblattern ähnliches Mittel wird finden können.

"* * Die Reduction der Menschenpocke zur Vaccine anlangend, so "muss die Lymphe aus Menschenpocken erst 10 Tage zwischen mit Wachs "verklebten Gläsern liegen, und dann mit warmer Kuhmilch verdünnt, gleich "der gewöhnlichen Vaccine geimpft werden; diese Impfung bildet an den "geimpften Stellen grosse Pocken, das die gewöhnliche Impfung begleitende "einmalige Fieber zeigt sich zweimal, zum erstenmale gegen den 3ten bis 4ten, "das zweitemal, und zwar heftiger, zwischen dem 11ten und 14ten Tage, die "peripherische Röthe ist stärker, und nicht blos an der geimpften Stelle, "sondern auch neben derselben entstehen zuweilen, jedoch immer nur ganz "kleine Pocken; die Narbe ist grösser und tiefer wie gewöhnlich, die Ränder "derselben zuweilen scharf. Zehn Generationen hindurch muss diess Verfahren "beobachtet werden, wodurch die Pocke nach und nach ganz der Vaccine "gleichkömmt; wenn das consecutive Fieber ausbleibt, dann kann man "Impfungen von Arm zu Arm ohne Verdünnung der Lymphe mit Kuhmilch "vornehmen."

Note III.—Relation of certain Current Contagia to Ages of Population.

The adjoining table expresses in four series of figures, arranged side by side, what may be considered, approximately at least, as the natural affinities of the four zymotic diseases named in it. The population under five years of age is of course always a minority of the entire population—in England at the last census somewhere about 13 per cent.; but that minority furnishes

Proportionate Distribution by Age of 1,000 Deaths in Geneva by Small-pox before the Discovery of Vaccination; and of the same Number of Deaths in England by Hooping Cough, Measles, and Scarlet Fever respectively, in the Year 1847.

Ages.	Small-pox.	Hooping Cough.	Measles.	Scarlet Fever.
0—1 - -	202½	404½	156½	63¼
1—2 - -	191½	275	340¾	145
2—3 - -	190	138½	201½	171¼
3—4 - -	132¼	77¾	117	153
4—5 - -	88¾	47¼	68	123½
0—5 - -	805	943	883¾	656
5—10 - -	155¾	52½	91¾	254½
10—15 - -	18½	2¼	13½	54¼
15—25 - -	13¾	½	4	12¾
Above 25 -	7	1½	7	22½
At all Ages -	1,000	1,000	1,000	1,000

the large majority of the deaths here referred to. Two thirds of all deaths by scarlet fever, four-fifths of all deaths by natural small-pox, a still larger proportion of all deaths by measles, and 943 of every 1,000 deaths by hooping cough belong to that fraction of the population. In a word, those are distinctively infantile diseases. And the obviousness of this fact represents three conditions:—first, that the susceptibility to those diseases develops itself very early in life; secondly, that the susceptibility, when once acted on by its corresponding exterior cause, becomes exhausted more or less absolutely for the remainder of life; thirdly, that the exterior cause or infection has been of sufficiently frequent recurrence among the population for those relations of susceptibility to show themselves. For the meaning of the diseases being infantile is, not that any insusceptibility to contract them is acquired in the mere act of growing up; but that—because the susceptibility developes itself at the commencement of life, and because the exterior influence which acts upon that susceptibility is seldom absent,—therefore all who have outlived the first years of childhood have commonly had each susceptibility exhausted by suffering the disease to which it relates. Hence, if all occurring cases of any such disease be classified according to the ages at which they happen, the resulting series of figures must necessarily have its maximum at that age where the special susceptibility is first fully developed. From this point it must undergo a more or less rapid and uninterrupted decline; the *uninterruptedness* being determined by the fact that at each succeeding age there will be fewer and fewer susceptible persons, the *rapidity* being graduated by the frequency or constancy with which the exterior cause is in operation. The infection of measles was carried to the Faroe islands in the year 1846 after an absence of sixty-five years; and it was then observed that (with exception of persons who had been touched in the former epidemic) nearly the whole population suffered. According to the very interesting history published by Dr. Panum (Virchow's Archiv. i. 492) there were—among 7,782 inhabitants of the islands—more than 6,000 attacks of measles. If these had been classified in the manner of which I speak, the maximum number corresponding to the age when the susceptibility is first fully developed, would probably have stood, as in the adjoining death-table, at the second year of life; but as all subsequent ages of that population up to sixty-five years represented a still susceptible class, the series of figures for these periods of life would have declined very slowly; probably, indeed, only at the same rate as the mass of living population declines from age to age. In the adjoining table, it deserves notice that deaths from hooping cough, and (in a trifling degree) those from small pox, are proportionately most abundant in the first year of life; deaths from measles in the second; and deaths from scarlet fever in the third. I have no reason to believe that a similar classification of *attacks* of those diseases respectively would (if one could obtain it) differ so materially from that classification of *deaths* as to reverse any important conclusion which may be drawn from the latter; and if not, there would seem to be evidence that the several specific susceptibilities to those respective diseases develop themselves, not simultaneously, but in succession. I would not insist much on the trifling difference between 202½, 191½, and 190 in the small-pox column; for although they show that the susceptibility to small-pox is largely developed in the first year of life, yet they leave it quite possible that the full susceptibility—if it could be tested by *attacks* instead of *deaths*—might be found rather in the second and third years of life than in the first. But a very early development of full susceptibility to hooping-cough, and a later development of susceptibility to scarlet fever, are strikingly suggested in the table. It deserves notice, however, that an analysis of deaths from the same diseases in *London* during the seven

years 1848–54, though showing generally the same distribution among different ages, presents a remarkable exception in the case of hooping-cough; the deaths from this disease in the first biennium of life being divided nearly equally between the two years; not, as above, in the proportion of $404\frac{1}{2}$ to 275, but (with a slight preponderance for the second year) in the proportion of $319\frac{1}{4}$ to $323\frac{1}{2}$.

Note IV.—Degeneration of Vaccine Lymph.

In support of the doctrine that the vaccine contagium has a natural tendency to degenerate in transmission, reference has been made to what commonly occurs in the *clavélisation* of sheep. In order to procure a mitigation of ovine small-pox, recourse has been had to the same sort of proceeding as used to be followed on the human subject; and the contagion of the disease has been artificially conveyed from sheep to sheep by inoculation with *claveau* or lymph, derived in the first instance from an animal having the natural disease. Monsieur Hurtrel d'Arboval, in his Dictionary of Veterinary Medicine (vol. i. p. 445) gives the following account of what ensues:—"Il est une observation bien digne "de remarque, c'est que le claveau perd de son activité et de sa propriété par la "succession de son inoculation. Vierden a observé qu'à la cinquième clavélisa- "tion, il ne produit pas qu'un bouton unique, et Boudouin fixe à la douzième "ou quinzième clavélisation successive le dernier degré de l'affaiblissement du "claveau. Passé ce terme, on ne remarque plus de veritable clavelée, ou "du moins on en voit trèsrarement. Il est donc nécessaire de renouveler de "temps en temps le claveau, en le reprenant sur des bêtes atteints naturellement "de la clavelée." Mr. Ceely however (to whom I owe my knowledge of this remarkable passage) does not receive, without reserve, the alleged degeneration of small-pox contagion in the sheep. He expresses to Mr. Simonds (see the latter's work on Variol. Ovin., p. 123) his doubt whether it may not have arisen in the absence of "care and selection in the transmission." But "if it be true, "when great pains are taken to repeat inoculations with lymph in a proper "state, viz., clear and limpid, it is a very remarkable and highly interesting fact, "and well worthy the attention of the members of the medical and veterinary "professions. . . . . I cannot help suspecting that the difficulty consists in "obtaining the virus before it is too late, for there certainly is a difficulty."

Whatever question there may be whether the contagium is naturally prone to degenerate, there can be no question as to the great frequency with which definite causes of degeneration operate on it. It is alleged, that, without any fault of the vaccinator, certain subjects act deterioratingly on the contagion which they transmit; that lymph taken from them is necessarily an inefficient lymph; that such subjects must occur in every line of succession; that thus at the end of any long series of vaccinations, effected from arm to arm *without selection of subject*, degeneration will certainly have been produced. Still more frequent danger to the efficiency of successive contagions arises of course in acts of personal carelessness, to which reference is hereafter made, especially in taking lymph from vesicles too advanced in their processes (when in fact it has degenerated), or from vesicles that have been disturbed in their course by mechanical or other irritation, or by accidentally concurrent diseases (especially skin diseases) in the subject. I cannot say to what extent the various modified stocks of contagion thus originated are capable of perpetuating their degenerative types: but whatever the extent may be, to that extent the results would tend to diffuse themselves in proportion to the number of vaccinations. Whether slow progressive degeneration of the vaccine contagion in its successive human transmission be or be not proved as inevitable, whether its renewal at stated intervals from the

cow be or be not an unconditional necessity, the practical conclusion evidently is, that its operation must in every case be intelligently watched; that no line of transmission is to be continued through a subject in whom imperfect infection is produced; that at any such point the vaccinator must stop; and that from all such points, when arrived at, re-application must be made to the parent stock—not necessarily at its source, but at least at some stage of descent in which its infective powers are unimpaired. Upon each individual vaccinator must rest the responsibility of providing in his own practice against those obvious chances of deterioration of supply. It becomes difficult or impossible to fulfil this obligation, except where the vaccinator carries on simultaneously a certain number of vaccinations; so that he may be able at any time to choose between several arms as sources for continuing his contagion, and may never be tempted to take lymph otherwise than from the typical Jennerian vesicle of a thoroughly healthy subject. It is on these grounds that persons who have given most attention to the scientific culture of vaccination (foremost among whom I am permitted to name Mr. Ceely and Mr. Marson) look with some alarm on our present minute subdivision of the duty of public vaccination, as tending to reduce many public vaccinators to an objectionable alternative; either that they must have frequent recourse to extrinsic assistance, or must incur the chance of the contagion degenerating by its transmission through unselected subjects. This danger would of course be greatly increased if (as has been suggested) the subdivision were carried further by arranging for public vaccination under a kind of general contract with the entire medical profession.

The following are quotations from authorities named at p. 229, as having drawn attention to the differences of efficiency between older and younger stocks of lymph:—

M. Bousquet (sur le Cow-pox) découvert à Passy le 22 Mars 1836) gives an elaborate account, illustrated with coloured plates, of the differences of operation which he observed between the current lymph of 1836 and that of a new source. One important difference was in power of *taking*:—"Sur un nombre égal de "vaccinés avec l'ancien et le nouveau virus, le premier a donné 628 boutons et "le second 776; différence 148, en faveur du dernier. Et remarquez que je ne "fais souvent que deux piqûres avec le nouveau vaccin, tandis que j'en fais "toujours trois avec l'ancien." This at p. 24; and, as regards some other differences, at p. 20—"On voit que le nouveau vaccin marche tout à la fois plus vite "et plus lentement que l'ancien; plus vite en ce qu'il donne plus tôt signe de "vie; plus lentement, en ce qu'il prolonge sa carrière beaucoup plus loin." M. Bousquet adds, that in vesicles produced by the new contagion, the lymph remained effective much later than in vesicles of the former source, and that the lymph was more effective for re-vaccination.

Dr. Gregory (Med. Gaz. xxi., p. 860) drawing a distinction in 1838, between two qualities of lymph, says, of that which he had abandoned, that—"For three "or four years past he had noticed a diminution of its intensity; eight or ten "incisions produced not more irritation than the three to which I was accus-"tomed fifteen years ago. In March last, Mr. Marson, the Resident Surgeon, "employed lymph from a different source. The new lymph was found to be far "more intense and active than the old lymph. . . These facts have convinced "me that vaccine lymph, by passing through the bodies of many persons, loses, "in process of time, some essential portion of its activity."

Mr. Estlin, in reference to one quality of lymph (Med. Gaz. xxii., p. 997) says—"The alterations in the vaccine infection which have appeared to me most marked "are the smallness of the vesicle and its attendant areola; its rapid course; the

" absence of constitutional disturbance ; the small quantity of lymph yielded by " the vesicle ; and especially the diminished activity of its infecting power." And subsequently (Med. Gaz. xxiv., p. 153) in reference to a different supply, which he had recently derived from its source, he observes—" Having watched " the virus through 29 subjects successively (nearly one every week since the " matter was derived from the cow), I have now no hesitation in stating, that " I consider it a valuable supply of virus, more energetic in its local and consti- " tutional effects, and more inclined to produce vesicles resembling what cow- " pox was many years ago, than that employed by the National Vaccine Esta- " blishment." Mr. Estlin soon after published (op. cit. p. 208) important testimony from the Vaccine Institution of Glasgow, stating that in 43 trials made with this lymph there had not been a single failure, whereas in the last preceding 43 vaccinations made with a former lymph there had been failure in 10 cases, and spurious or imperfect vesicles in 9 others ; that at this Institution, in the course of the preceding $3\frac{1}{3}$ years, there had " at four different periods occurred an entire " degeneration of the lymph, and a consequent complete failure of the vaccina- " tion ;" and that, at the very time when the new supply reached them such a failure was being illustrated in the fact that "all the children vaccinated upon " the day week preceding, presented, instead of true vesicles, raw surfaces re- " sembling spots that had been vesicated and then denuded of their cuticle."

Professor Hering, of Stuttgart, (über Kuhpocken an Kühen, p. 166) writes— " Die von originärer Kuhpockenlymphe bei Kindern entstehenden Pusteln sind " meist durch Grösse, stärkere locale Entzündung, heftigeres Fieber und " langsameren Verlauf ausgezeichnet. In selteneren Fällen kommt aber auch " das Gegentheil vor. Die stärkere Einwirkung auf den menschlichen Körper " ist oft noch in der zweiten und dritten Impf-Generation bemerklich. Die " Impfung mit solch erneuertem Stoffe schägt seltener fehl als mit dem seit " langer Zeit nicht mehr aufgefrischen. Ein frieselähnliches Exanthem begleitet " manchmal die Impfung mit originärer Lymphe." In the little volume referred to there is an unusual amount of information on the subject ; for, during the ten years 1827–37, genuine cow-pox had been observed in Wirtemberg on 69 different occasions ; and its contagion had been successfully transferred to the human subject at least 170 times out of about 210 trials.

M. Fiard, communicating to the Académie des Sciences in 1844 the results of an experimental comparison which he had just instituted between the action of lymph then newly derived from the cow and the action of other lymph which was of eight years' descent, uses these words:—" Jusqu'au huitième jour (comme " cela a lieu pour la varioloïde et la variole) la différence est nulle ; mais à " dater du neuvième jour, la dessiccation des pustules de l'ancien vaccin com- " mence ; elle est complète du treizième au quatorzième jour. Le nouveau, au " contraire, poursuit sa marche et son développement plus lentement, et la " dessiccation n'est complète que du seizième au dix-septième jour. C'est donc, " entre ces deux vaccins, une différence de trois ou quatre jours. Le vaccin de " Jenner, après un séjour de trente-neuf ans sur l'homme, comparé en 1836 à " celui de 1836, était tombé au point que sa dessiccation avait lieu le douzième " jour, tandis que celui de 1836, comme celui de 1844, n'arrivait à la dessicca- " tion complète que le dix-septième jour. Il y avait donc une différence de " cinq jours. Celui de 1836, aujourd'hui, après huit ans de séjour sur l'homme, " comparé à celui de 1844, dont la dessiccation n'est complète que le dix- " septième jour, arrive à cette dessiccation du treizième au quatorzième jour ; " c'est donc trois ou quatre jours qu'il a perdu sous le rapport de la durée " éruptive. Or, d'après ce qui précède, il est évident que le vaccin de 1836, en

" huit ans, a subi aujourd'hui une atténuation. Donc il faut le remplacer par " le nouveau, puis se mettre en mesure pour opérer le renouvellement tous les " cinq ou six ans."—Comptes Rendus des Séances de l'Acad., 1844, p. 749.

Dr. Steinbrenner (op. cit. p. 252) in describing the results of his own comparative experiments, says :—" On pourrait presque dire que les pustules de vaccine " ancienne sont aux pustules de vaccine régénérée ce que les pustules de " varioloide sont aux pustules de variole. En effet, comme dans la varioloide, " les pustules du vaccin ancien sont moins développées, se dessèchent plus " rapidement, l'affection générale qui les accompagne est plus légère, elles " laissent des cicatrices bien moins profondes," &c.

It is an interesting and instructive fact that, in the days of small-pox inoculation, questions very similar to these were raised. Jenner (op. cit. Edit. 3, p. 52) speaks of inoculations " with inefficacious variolous matter " which gave no permanent security, though the immediate results were to all appearance sufficient. In one striking set of cases (p. 80) a surgeon had inoculated "from a " pustule which, experience had since proved, was advanced too far to answer " the purpose intended." The local results which followed, and the eruptions which appeared about the ninth day (but " died away earlier than common " without maturation ") were such as induced the operator—and, he says, might have induced any one—" to suppose that the persons were perfectly safe from " future infection." But of the five, who were thus inoculated, " four took the " small-pox afterwards in the natural way; one of whom died, three recovered, " and the other, being cautious to avoid as much as possible the chance of " catching it, escaped from the disease through [the remaining twelve years " of] life."

Note V.—Renewed Attacks on Vaccination.

The following are the terms in which M. Verdé de Lisle (de la Dégénérescence Physique et Morale de l'Espèce Humaine déterminé par le Vaccin ; Paris, 1855) opens his case against vaccination :—" L'espèce humaine dégénère ; aux " puissantes races des siècles passés a succédé une génération petite, maigre, " chétive, chauve, myope, dont le caractère est triste, l'imagination sèche, l'esprit " pauvre . . Remontons enfin à l'origine : la cause unique de ce désastre " multiple, c'est la vaccine . Voyez cette génération inerte, rachitique, frappée " en naissant d'impuissance et de vieillesse. Prenez-la dès le collége, froide, en " proie à une paresse triste . pauvres enfants, qui n'admettent que la malice " paisible, pour qui l'espièglerie est trop gaie, l'exercise trop fatiguant . . " Suivez-les . ils n'ont jamais dansé . . Rappelez-vous nos pères, la forte " race de l'empire? aujourd'hui les compagnies d'hommes de cinq pieds six " pouces appartiennent à l'histoire . . Après Voltaire, après Beaumarchais . " le triste spectacle d'une foule de petits personnages qui ne peuvent éléver leur " présomption plus haut que la collaboration et la critique . . L'Angleterre . " n'a même plus ni un Sheridan, ni un Dryden quelconque; son éloquence " parlementaire s'arrête à la pléïade contemporaine de Lord Palmerston. " L'Allemagne . s'est arrêtée à Jean Paul . . En musique, à défaut des " Gluck, des Mozart . des Boieldieu . le métier nous donne les nombreux " arrangeurs. En peinture, après les Rubens, les Van-Dick . il nous faut " tomber sans transition de la puissance de Géricault à la patience de Meisonnier. " . . On prétend être sérieux ; tout simplement on est grave et ennuyé. . " A un mal, ils en ajoutent un autre ; ils compliquent le premier empoissonne- " ment, ils fument pour avoir l'air de penser . . Les exemptions du service " militaire . ont pris des proportions de plus en plus considérables. . .

"A quoi bon l'air? Les pores de la peau sont oblitérés, les poumons sont "tuberculisés. . A quoi bon la nourriture saine? à quoi bon préserver "l'economie des miasmes pestilentiels?" etc. It requires no medical knowledge to gauge the capacity of this fiction. Its nonsense is only to be equalled in burlesque literature; and perhaps the nearest parallel is presented in a familiar line of the *Rejected Addresses*, where the indignant author of "A Loyal "Effusion" intimated that Napoleon Buonaparte had "filled the butcher's shops "with large blue flies." The physical degeneration of man is, indeed, an old cry. Every age in its turn has looked back wistfully on some imagined possession of the golden past—some strength, or stature, or nobility which belonged exclusively to its good old times. Not two of Homer's contemporaries (οἷοι νῦν βροτοί εἰσι) could move such stones as Ajax and Æneas had hurled; and the same tendency to believe in a gradual degeneration of mankind has, from then till now, been expressed in inumerable forms. That "the world is in "its dotage," is a doctrine which, a century ago, was sufficiently current and sufficiently ridiculous to be used for the purposes of the humourist. The reader of the Vicar of Wakefield remembers it in the mouth of Ephraim Jenkinson as representing just that sort of gabble which could be used for the stock-speech of a sham philosopher; and Dr. Primrose might well, on the second occasion, think he had "heard all this before."

NOTE VI.—COMPARISON OF ENGLISH DEATH RATES FROM ALL CAUSES IN PRE-VACCINATION AND POST-VACCINATION TIMES.

The nearest approach to an exact pre-vaccination death rate for England is the very limited one which we have in the Tontines of 1774–8 and 1790; but this (besides being insecure from the smallness of its material) is made almost inapplicable for my present purpose by the fact that the nominees in these Tontines were *selected*—chiefly of course with reference to their chances of comfort and longevity; and to compare our *average* death-rates with the death-rates of a population so selected, would be to defeat the objects of comparison. Mr. Finlaison has kindly obliged me with his calculation of the Tontine death-rates, and I have embodied them in the subjoined table side by side with certain other death-rates for the same periods of life. For special comparison with the Tontine death-rates, I have inserted the death-rates of two populations of the present time, where circumstances operated in some respect

ANNUAL DEATH RATE per 10,000 living at Ages and in Populations as below.

Ages and Sex.	Tontines of 1774–8.	Tontine of 1790.	Friendly Societies of Great Britain.	Sixty-three Healthy Districts of England, 1849–53.	England and Wales (Reg. Gen.) 1845–54.
MALES:					
15–25 - -	111·467	118·634	61·9	69·1	83·3
25–35 - -	117·302	118·683	75·5	81·8	101·5
35–45 - -	139·351	130·520	93·9	92·8	130·9
FEMALES:					
15–25 - -	83·149	84·268	66·5	76·5	86·3
25–35 - -	101·254	85·299	75·1	89·4	108·3
35–45 - -	114·416	99·283	92·8	99·8	129·3
MEAN:					
15–25 - -	97·308	101·451	64·2	72·8	84·8
25–35 - -	109·278	101·991	75·3	85·7	104·9
35–45 - -	126·883	114·901	93·4	96·4	130·1

equivalently to the selection which I have described. I have taken, first, the *death-rates of the provident classes* from materials given by Mr. Neison in his recent "Contributions to Vital Statistics"; and secondly, the *death-rates of the population of the* 63 *healthiest registration districts of England and Wales*, as estimated by Dr. Farr. These populations—the former in respect of somewhat easier circumstances and better-regulated lives, the latter in respect of advantages of residence—may be considered as select populations, fairly comparable with Tontinists. I have also inserted in the table the general (unselected) death-rates of England and Wales, as given by the Registrar General for the years 1845-54. I must, however, confess that the standard of comparison appears to me radically defective. The great difference between the death-rates of the two sexes of Tontinists shows, I think, one of two things: either that the population-basis of these calculations has been too small for a trustworthy result, and that some fallacy affects the death-rate of one sex or the other; or else that circumstances, unknown to the present age, did really at the periods referred to make that large difference between the death-rates of the sexes. In either case it would be unsafe to draw conclusions from the comparison; and therefore it is that the table is set here rather than inserted in the text. In the last part of the table is set the mean rate for the two sexes in respect of each of the five populations compared, and in this of course the discrepancy is concealed. But I am not prepared to say that any trustworthy conclusion may be drawn from it.

Note VII.—Indifference of Typhoid Fever to difference between Variolated and Vaccinated Persons.

In the Report for 1852 of the Vaccination Board of the Department of the Rhone, Dr. Roy, of Lyons, writes as follows:—"Une jeune fille varioleuse "avec taches ecchymotiques entrée au mois d'Octobre dans notre service, suc- "comba dans les vingt-quatre heures qui suivirent son entrée. Trois jours après "deux malades convalescentes de fièvre typhoïde sont prises de variole: une "d'elles a succombé. Nous avons observé deux cas de fièvre typhoïde chez des "ouvrières qui portaient des cicatrices nombreuses de variole antérieure."

And again, the Report for 1853 of the same Board, besides other references, quotes these cases from Dr. Piérou:—"Dans une maison, les six personnes qui "l'habitaient ont eu, en 1853, la fièvre typhoïde; sur ce nombre, deux avaient "eu antérieurement une variole confluente, ce qui n'empêcha pas la fièvre "typhoïde d'être aussi grave que chez les personnes vaccinées. Un homme de "48 ans, soignant son fils vacciné, atteint de fièvre typhoïde, et portant lui-même "des traces de variole confluente antérieure, a eu la même fièvre que son fils; "tandis que sa femme, bien vaccinée, en fut exempte, quoiqu'elle eût soigné son "fils et son mari, passant les nuits près d'eux pendant près de deux mois. Enfin, "M. Piérou cite encore deux femmes avec cicatrices varioliques nombreuses "atteintes plus tard de la fièvre typhoïde."

Subjoined to the latter Report is a paper, which had recently been communicated to the Académie de Medecine of Lyons, by Dr. Teissier, Physician of the Hôtel Dieu; telling that among 170 cases of typhoid fever which, during the past eighteen months, had been under his treatment, there were 30 where the patient bore marks of previous small-pox; and adding that within the same period he had seen more than 20 illustrations of small-pox attacking persons who had previously had typhoid fever; two of whom were at that moment still in his ward, having been seized with the former disease when just convalescing from the latter.

The Paris Academy, in its Report for 1852, speaks of interminable facts of the same sort, specifying only a few of them:—"M. Barth a vue, dans son service

" à l'hôpital Beaujon, quatre cas de fièvre typhoïde sur des sujets non vaccinés, " et marqués de la petite vérole. Un seul est mort; c'était justement le plus " marqué. Et l'inverse, il a vu encore plus souvent la petite vérole après la " fièvre typhoïde . . . . . M. le Docteur Lasnon a raconté qu'appelé dans " le cours d'une épidemie, pour voir quatre enfans de la même famille, il eut la " douleur de voir périr les deux garçons, âgés de 25 à 26 ans; les deux sœurs " s'en tirèrent, mais elles ne se relevèrent de la petite vérole que pour mourir " plus tard de la fièvre typhoïde . . . . Un honorable académicien a trouvé " dans un seul rapport dix-sept cas de fièvre typhoïde, dont neuf sur des sujets " qui avaient eu la variole naturelle."

In the Gazette Médicale de Paris, 1854 (p. 530) Dr. Thore writes a paper, in which, besides quoting similar cases from several other authorities, he details from his own experience, as follows : first, 8 cases of typhoid fever, sometimes of great severity, following small-pox in non-vaccinated persons aged from 19 to 51; and secondly, 6 cases of small-pox, modified and unmodified, following typhoid fever in vaccinated and non-vaccinated persons aged from 9 to 20. Dr. Thore appropriately quotes Stoll's information about fever in Vienna in the last century, to the effect that, during a period of 12 years, about two-fifths of all Vienna deaths were produced by it, and that it proved fatal to nearly one-seventh of all whom it attacked.

Professor Forget, of Strasburg, had published in 1852 (Gaz. des Hôpit. p. 79) an important memoir, discussing the question on general pathological grounds, and giving cases in support of his opinion. He institutes an extended comparison of the two diseases, as to their respective anatomical affinities and the nature of their morbid processes, and the symptoms (especially the relation of the fever to the local changes) of each. He argues that " l'apparence pustuleuse de la " dothinentérie est exceptionelle et ne constitue qu'une forme assez rare;" and he concludes, " (1) que la comparaison entre les deux maladies n'est pas souten- " able; (2) que l'enterite folliculeuse ne préserve pas de la variole; et (3) que " l'une pouvant succéder immédiatement à l'autre et vice versâ, c'est le comble " de l'inconsequence que d'établie entre ces deux affections un esolidarite que " rien ne justifie."

A careful description by M. Blot, communicated to the Société de Biologie (Gaz. Méd. 1854, p. 731), illustrates this further point; that when, rarely enough, small-pox does develop pustules along the intestinal canal, these differ essentially in their distribution and character from that affection of a specific glandular structure, which is characteristic of typhoid fever. It is remarkable, too, that in M. Blot's case not even M. Carnot could have regarded the intestinal pustules as *la variole détournée par la vaccine:* for never had patient been less vaccinated; the intestines were those of a *fœtus;* the mother herself, not vaccinated, had had modified small-pox; and the intra-uterine child had thus contracted small-pox, died, and been expelled. In addition to an abundant variolous eruption on the skin there were great numbers of pustules in the stomach, and all along the small intestine at every part of its circumference.

In *Canstatt's Jahresbericht* for 1851 I read of a paper by Dr. Debourge (published in the Brussels *Journal de Médecine,* Nov. 1851) answering M. Carnot with the following illustration :—A village in M. Debourge's neighbourhood had been visited by typhoid fever so severely, that almost the whole population—especially that part which was between 20 and 40 years of age—had suffered. Four years afterwards, small-pox prevailed there (nearly the whole population being unvaccinated) and attacked and killed indiscriminately those who had, and those who had not, suffered from the typhoid infection.

NOTE VIII.—EARLY WORKING OF THE COMPULSORY VACCINATION ACT.

The annexed Table (for the particulars in which I am indebted to Mr. Tomkins, Inspector of Vaccinations to the National Vaccine Establishment) illustrates that disobedience to the secondary provisions of the law has also increased, and—to judge from this sample—has prevailed in a large majority of even those cases in which vaccination has been duly performed. The Act of Parliament requires that vaccinated children shall on the eighth day be taken back for inspection as to the success of the vaccination, and shall receive a certificate of its success. Mr. Tomkins shows that, of 407 cases vaccinated by him in the last $6\frac{1}{2}$ months, only 97 were brought back for inspection, and only 3 received certificates. The Registrar's Notice, which enjoins that "this paper must be shown to the medical practitioner when the child is taken "to him for inspection after vaccination," was presented in only 58 of the 97 cases.

Proceedings at the Central Station of the National Vaccine Establishment.	Vaccinations performed by the Inspector.	Cases brought back for Inspection on the 8th Day.	Cases brought with their corresponding Registrar's Notices.	Certificates of Successful Vaccination given to Applicants.
Sept. 1853—Sept. 1854 -	1,192	289	265	86
Sept. 1854—Sept. 1855 -	1,502	210	179	29
Sept. 1855—Sept. 1856 -	943	256	195	24
Sept. 1856—April 1857 -	407	97	58	3

On the whole three years the infantine vaccinations of England and Wales have amounted to nearly three-fifths of the births. The annexed table, giving an account of such vaccinations in the different parishes of the metropolis, may illustrate how very unequally different places contribute to the general proportion. In the parish of St. Matthew, Bethnal Green, for every hundred births during the three years 1854–6, there have been 81 infantine vaccinations by the public vaccinator. In the parish of St. Luke's there have been only 28. Without local inquiry, it is not possible to decide how much of the apparent insufficiency of infantine vaccination in certain districts is really what it seems; but there are many differences in the table for which I am unable to account otherwise than by supposing that there are corresponding differences of merit in the local arrangements for public vaccination.

INFANTINE VACCINATIONS performed in the METROPOLIS during the TRIENNIAL PERIOD 1854–6.

PARISHES.	Births.	Vaccinations under 1 Year of Age.		
		Successful.	Total Number.	Total Number per 100 Births.
St. Matthew, Bethnal Green - -	10,944	7,909	8,880	81·1
St. Luke, Chelsea - - - -	5,670	3,250	3,427	60·4
Clerkenwell - - - - -	6,642	3,215	3,216	48·4
Fulham - - - - -	3,119	1,866	1,883	60·4
St. George (East) - - - -	5,585	2,448	2,462	44·1

INFANTINE VACCINATIONS performed in the METROPOLIS during the TRIENNIAL PERIOD 1854-6—*continued.*

PARISHES.	Births.	Vaccinations under 1 Year of Age.		
		Successful.	Total Number.	Total Number per 100 Births.
St. George (Hanover Square)	6,195	3,031	3,311	53·4
St. Giles and St. George (Bloomsbury)	5,357	1,870	1,891	35·3
Hackney	6,347	2,935	3,002	47·3
Hampstead	987	344	393	40·1
Holborn	4,223	2,381	2,446	57·9
St. Mary, Islington	12,209	6,422	6,626	54·3
St. James, Westminster	2,816	1,278	1,492	53·0
Kensington	5,053	2,032	2,079	41·1
City of London	3,611	1,141	1,152	31·9
East London	4,517	2,403	2,447	54·2
West London	2,457	1,552	1,561	63·5
St. Luke, Middlesex	7,457	2,059	2,035	28·0
St. Margaret and St. John, Westminster	6,618	4,125	4,356	65·8
St. Martin-in-the-Fields	2,001	1,435	1,479	73·9
Marylebone	13,620	6,543	6,578	48·3
Paddington	5,015	1,885	1,933	38·5
St. Pancras	18,200	8,243	8,407	46·2
Poplar	7,570	4,337	4,381	57·9
Shoreditch	14,045	8,355	8,618	61·4
Stepney	13,188	5,699	5,730	43·4
Strand	7,412	2,584	2,637	35·6
Whitechapel	8,301	5,926	6,113	73·6
Bermondsey	6,152	2,764	2,805	45·6
Camberwell	5,995	3,043	3,271	54·6
St. George, Southwark	5,750	2,881	3,078	53·5
Lambeth	15,813	6,037	6,217	39·3
St. Mary, Newington	7,844	3,252	3,388	43·2
St. Olave	1,717	866	866	50·4
Rotherhithe	1,754	836	836	47·7
St. Saviour	3,762	2,803	2,803	74·5
Wandsworth and Clapham	5,358	2,359	2,420	45·2
Greenwich	11,464	6,041	6,278	54·8
Lewisham	4,361	1,655	1,753	40·2

NOTE IX.—MENTION OF SOME ADDITIONAL SOURCES OF INFORMATION.

Since the date of this letter, I have received a valuable communication (Die Kuhpocke und ihre Bedeutung; eine Beantwortung der von der K. grossbritt. Gesandtschaft vorgelegten Fragen; von Dr. Raimund Melzer, k.k. Director des Bezirkskrankenhauses auf der Wieden in Wien) from Dr. MELZER, of Vienna; which, if it had reached me earlier, I should have laid under considerable contribution. Dr. Melzer treats the entire subject with much skill; but the especial interest of his paper consists in a comparison which he draws (with the support of some volumes of documentary evidence) between Carniola and Carinthia, in respect of their prevailing diseases. He affirms (in a sense directly opposed to M. Carnot's doctrine) that Carinthia, where vaccination has

been greatly resisted, suffers so much from scrofula, typhoid fevers, and other contagious diseases, as to be unable to furnish the army with its proper contingent of recruits; while Carniola, where vaccination has always been received with the greatest favour, not only furnishes its own contingent, but makes up for the deficiencies of the other province. Also I received, unfortunately too late to be translated for my Appendix, a treatise (Die Kuhpockenimpfung; eine Beantwortung der vom General Board of Health aufgestellten Fragen, von Dr. Carl Friedinger, prov. Impfarzt im k.k. Kuhp. impf. Hauptinstitut, und prov. Hauswundarzt der k.k. Findel-Anstalt in Wien) on the entire subject by Dr. FRIEDINGER, of the same city, whose opportunities of observation in the great Foundling establishment of Vienna give peculiar value to his statements. I need the less regret the absence of this communication from my Appendix, as Dr. Friedinger has taken part in furnishing the very important paper (p. 154) which is contributed by the Society of Surgeons of Vienna; and his views are no doubt embodied therein with those of his distinguished colleagues. I have also to thank Dr. BERTIN, of Nancy, for a paper of much merit (Essai historique et critique sur les attaques dirigées contre la Vaccine) published by him last year in refutation of M. Carnot and his followers. I have read with pleasure and instruction many other works than those which I have expressly quoted in my Letter; and among such I may name a very sensible little book written thirty years ago by Mr. GREENHOW, of Newcastle, and some papers by Dr Alexander KNOX, "On the existing state of our knowledge of Vaccination and "Re-vaccination," published in the *London Journal of Medicine*, Nos. XXIII and XXIV. I observe that I have not specially quoted Dr. EIMER'S very excellent work (Die Blatternkrankheit in pathologischer und sanitätspolizeilicher Beziehung; Leipzig, 1853) and therefore it is incumbent on me to acknowledge that I have often referred to it with advantage. Dr. STEINBRENNER'S work (Traité sur la Vaccine; ouvrage couronné par l'Académie Royal des Sciences en 1845; Paris, 1846) I have indeed quoted; but hardly in proportion to the indirect assistance I have derived from its learned, but unmethodical, treatment of the subject.—MAY 20th, 1857.

THE SYSTEM OF PUBLIC VACCINATION IN ENGLAND.

EXTRACTS FROM PRIVY COUNCIL REPORTS RELATING TO THE SYSTEM OF PUBLIC VACCINATION IN ENGLAND.

[From the First Report, 1858.]

II.—As regards the National Vaccine Establishment and the Supply of Vaccine Lymph.

National supply of vaccine lymph.

The short period during which the National Vaccine Establishment has been subject to the supervision of the Privy Council has to it been one of special importance; for within this time its directors have found themselves obliged, with your Lordships' sanction and assistance, to begin an essential change in what, for 50 years, had been the uniform practice of the institution.

It may be convenient to your Lordships that, before describing the nature of this change, I give an outline of the objects, constitution, and recent history of the establishment.

The original "object of establishing the National Vaccine "Institution (as declared in Parliament in 1808, by those "who promoted its first institution) was to forward the "general adoption of vaccination throughout the empire, "by giving to the practice the public countenance and "support of Government. To most persons of intelligence "the results of experience, both at home and abroad, appeared, "even at that time, decisive of the great advantages of "vaccination; but whether or no it were infallible, as a "preventive of small-pox, was a question still involved in "uncertainty. In order, therefore, to ascertain with precision "the facts by which those doubts might be dispelled, to "conduct such investigations under the eye of the public, "and to insure accuracy to the publication of the results "when ascertained, it was proposed that all cases of reputed "failure should be referred to the Board. The Board were

" also to organize and set in action a central institution, for " carrying on in London, under their own immediate super- " intendence, the practice of vaccination, and for distributing " vaccine lymph to every part of the empire."* Of these objects there are several with which, in the course of time, it became unnecessary that the National Vaccine Establishment should occupy itself; and for more than twenty years the usefulness of the establishment has been restricted to the very important function of maintaining for general use, and distributing as wanted, a supply of trustworthy vaccine lymph. Its proceedings for this purpose have been directed by a Board, which, in the first eighteen years of its existence (1808–26) was composed of eight medical members; in the next six years (1826–32) of five; and in the following twenty-five years (1833–57) of three,—the president and senior censor of the Royal College of Physicians, and the president of the Royal College of Surgeons. With these eminent functionaries of my profession, I have for the last year, at the desire of Her Majesty's Government, had the honour of being associated in the direction of the establishment.

The proceedings of the Establishment, briefly described, have been these:—Gratuitous vaccination has been performed by it at several special stations in the metropolis; each stational vaccinator has contributed to the central office as many charges of lymph as he could obtain from subjects vaccinated by him; and the central office has distributed these charges gratuitously to all proper applicants.

Such for many years, on a very extensive scale, has been the action of the National Vaccine Establishment; and last year nearly 234,000 charges of lymph were distributed by the Board among 12,418 applicants. Constantly among the applicants are persons who, except for the existence of a central office, would be at a loss how to obtain what they desire; and application is often made under circumstances of emergency, when small-pox is at hand, and when waste of time would be a serious evil. Evidently, then, it is of essential importance that the sources of supply on which the

* Report from the Select Committee on the Vaccine Board, ordered by the House of Commons to be printed, 28th August 1833.—J.S.

central office depends for its means of meeting the public demand should be placed beyond any probability of failure.

These sources, up to the present year, had consisted exclusively in the special stations of the establishment itself. But of late it had been observed, and the observation was cause for much anxiety, that year by year those stations were becoming less and less resorted to for vaccination, and consequently less and less to be relied on for fulfilling the main object of their existence.

This gradual decline in the number of vaccinations performed by the National Vaccine Establishment depended altogether on causes exterior to the administration: it had resulted from successive changes in the law.

For more than thirty years after the establishment of the National Vaccine Institution, there existed in all England no other legalized local arrangements for public vaccination. Such other gratuitous vaccination as there was, depended on personal goodwill or on the action of charitable institutions. Even an overseer, it was said, was "not bound to take means to procure "the poor children of the parish to be vaccinated during the "prevalence of small-pox." And under these circumstances, the stations of the Vaccine Establishment existing in the metropolis were an important boon to the public, and were of course considerably resorted to.

Nineteen years ago, the Legislature first provided (3 & 4 Vict. c. 29) that vaccination at the public cost might be claimed of local authorities in every parish of England and Wales; and this enactment was soon followed by a fuller provision (necessary because poor-law guardians and overseers were to be the administrators of the law) that gratuitous vaccination should not place its recipient in the position of persons receiving parochial relief. In 1853 this system received further extension by the passing of the Compulsory Vaccination Act; under which it became an obligation on parents and guardians, that in future all children, their health permitting, should be vaccinated within, at furthest, four months from birth. And although of course it was not in the letter of this law that peculiarly the parochial vaccinations should be increased by it, yet, from accidental circumstances which

I need not now trouble your Lordships to consider, such in effect has been its operation.

These successive Acts of Parliament, in creating and developing the system of parochial vaccination, necessarily reduced the number of applicants at the National Vaccine Establishment. In 1838, the number of vaccinations performed by the establishment amounted to 18,659 ; during the three years 1850–2, the average annual number was only 10,713 ; during the three years 1854–6, it had fallen to 8,207 ; and last year it reached but 6,445.*

It will be obvious to your Lordships that, if the primary object of the National Vaccine Establishment had been to provide public vaccination, there was now no reason why it should continue to exist. But, in fact, its performance of public vaccination had no other meaning or importance than that the establishment might thus be enabled to fulfil what had become its one essential function—the function of maintaining and distributing a supply of authenticated vaccine lymph. And this duty had become of even increased importance ; for, with the minute subdivision of vaccination-districts, and with other unfortunate accidents of the new system, it appeared certain that local supplies of lymph would, generally speaking, not be maintained long in an efficient state, and consequently that well-organized central arrangements for the collection and distribution of lymph were absolutely indispensable to the country.

The subject, too, was of somewhat urgent importance ; not simply because the National Vaccine Establishment was currently distributing more lymph than in 1838, when its vaccinations were nearly thrice as numerous as of late ; but because experience suggested that, in case of any great stimulus being given to public vaccination (such as was given in 1853

* To this reduced number of vaccinations, seventeen different stations in the Metropolis contributed in unequal proportion : two of them together effecting 3,502 vaccinations, or considerably more than half of the total ; while the remaining fifteen contributed various numbers, varying respectively from 72 to 373. At some of these fifteen stations vaccination was offered to the public twice, at others three times a week ; but from an analysis of their statistics, it appeared that the average number of cases vaccinated at each of them on each vaccinating day was only about $1\frac{1}{2}$.—J.S.

by the Compulsory Vaccination Act, and such as, it was hoped, might be more uniformly given under the Public Health Act, 1858) the average demand for lymph might suddenly rise 50 per cent.—attaining an amount which the Board, with its reduced and inelastic resources, could not undertake to supply.

It therefore became necessary to consider what plan could be adopted to compensate for the advancing diminution of those sources of lymph on which the public had heretofore depended for supply.

Only one course, it appeared, was open. As the original sources of supply were becoming extinct through the competition of the new system of parochial vaccination, so the question arose, whether, in this new system itself, there could not be found a compensation for what was lost. For, generally speaking, it would seem self-evident, that the common supply of lymph in a country ought to be founded on the common provisions for public vaccination; that arrangements for the two purposes are essentially parts of one system; and that sources of lymph-supply disconnected from the national plan of vaccination could hardly be expected to have permanence.

Now, it was certain that at the parochial vaccinating-stations of large towns there must often exist abundant and eligible sources of lymph; but it was equally certain that those stations could not indiscriminately be utilised for the purpose of a national supply.

In the first place, well-frequented stations could alone be thus available. In order to keep up a mere succession of normal vaccine vesicles at any single station, it is requisite that vaccinated subjects returning for eighth-day inspection should habitually be numerous enough for ample selection to be exercised among them as to the taking of lymph; and much more, of course, is this necessary, if the succession is to be so abundant as to furnish an excess of lymph in aid of other vaccinating-stations. England contains dozens of large towns which might reasonably be expected to contain stations of sufficient magnitude for the purpose; but in many of these instances (and important metropolitan parishes are cases in point) the public vaccination is parcelled out among so many

vaccinators, that perhaps not one station can conveniently be looked to for lymph. Again, very strict scrupulousness—almost fastidiousness, in everything which concerns the performance of vaccination and the watching of its results, must be claimed from persons who would supply lymph for the public service; for any mischief herein resulting from slovenly practice may not only be irremediable in some one particular case, but may ramify injurious results among large numbers of sufferers.

Obviously, then, the national supply of lymph could not properly be made even partly contingent on parochial contributions, unless with the understanding that each contributing-station should in the first instance be carefully chosen, with reference both to its resources and to the qualifications of its vaccinator, and should afterwards be vigilantly superintended with reference to its proceedings and results. Subject, however, to these conditions, it appeared not only that this course was admissible, but that in fact no other course in the present state of the law would enable your Lordships to ensure a sufficient supply of lymph for meeting the requirements of the public.

In a report, addressed in 1857 to the President of the then General Board of Health, I had drawn attention to the impending necessity, that some such arrangement should be made; and now, as a member of the National Vaccine Board, I felt it especially my duty to bring before my colleagues (whose solicitude had already* been awakened on the subject) the considerations which I have submitted to your Lordships. Great advantage had been anticipated to the public service from the fact that, through the present constitution and relations of the National Vaccine Board, the Privy Council would have ready means of consulting, in reference to vaccination, with the heads of the two great Colleges of Medicine and Surgery; and, in the present case, that expected advantage

* The President of the College of Physicians, who is President of the Vaccine Board, had already, on the part of the Board, before it came under the direction of the Privy Council, waited upon Her Majesty's Secretary of State for the Home Department, to express the hopes of the Board that Government would take measures to prevent the anticipated scarcity of lymph.—J.S.

was fully realised by the long and careful consideration which my distinguished colleagues gave to the subject. The result of the deliberation was a Minute of the Board, communicated to your Lordships on Nov. 17th ; a copy of which minute, as an important proceeding under the Act, is appended (App. No. 2) to this Report.

The minute, after recounting the principal facts which had been under consideration, and specially adverting to the sources of lymph which are to be found at the parochial vaccinating-stations of Manchester, Liverpool, Birmingham, Leeds, Sheffield, Newcastle, and other large towns, made the following conditional proposal :—"that if the Board of the National "Vaccine Establishment were satisfied that the public vaccinators of those stations would uniformly exercise proper "care in the selection of lymph for transmission, the Board "would be prepared to discontinue its own less productive "stations, and to recommend the procuring of lymph from "parochial vaccinators at the stations referred to."

The Privy Council, with its present regulative and inspectional powers in reference to public vaccination, could give every reasonable security for the fulfilment of the condition here stated as necessary ; and the minute having expressed the hopes of the Board that the Lords of the Council would be pleased to direct such inquiries as were needful for the object in view, your Lordships acceded to this request.

Inquiry was accordingly made into the state of public vaccination in Manchester and Liverpool ; and, as the practical result of this inquiry, arrangements have since been made under which the largest vaccinating-station of Manchester has become contributory to the lymph-supply of the National Vaccine Establishment. At the station in question, Mr. Evan Thomas, one of the Medical Officers of the Union, performs nearly 1,800 vaccinations in the year ; and it is believed that, when the difficulties of a commencement are overcome, some twenty to thirty thousand charges of lymph may annually be furnished from this one source.

In two respects the step which has been taken seems to be of great importance. In the first place, as opening a communication—though hitherto only at one point—between the

National Vaccine Establishment and the staff of parochial vaccinators, it begins to combine as one system the arrangements for public vaccination with the hitherto separate arrangements for the supply of vaccine lymph; and thus to give to the latter arrangements a securer basis than they for many years have had. In the second place, it makes a commencement towards what may hereafter, with much advantage to the public, fill a present want in medical education. For hitherto it has been the case, that neither the ordinary schools of medicine have had means of practically teaching vaccination, nor have any of the public vaccinating-stations been opened as public schools for the purpose. Consequently many a medical student has completed his studies without having had any convenient opportunity of learning to vaccinate; and although the mere manipulation with the lancet scarcely requires special study, yet to know well the results of vaccination, especially to know well and practically the characters of a vesicle from which it is proper to take lymph, does require some little attentive and accurate observation. It has therefore often been wished that some well-frequented vaccinating-stations, situated in those large towns where medical schools exist, could be available for educational purposes. To connect such stations with the National Vaccine Board by making them superintended contributories of lymph (as is now done in the case of Manchester) is a first step towards giving them that special position and guaranteed character which would suggest their being recognized as national schools of vaccination.

[From the Second Report, 1859.]

PROCEEDINGS IN REFERENCE TO PUBLIC VACCINATION.

1. *Regulations issued under the Public Health Act,* 1858.

VACCINATION. Regulations issued under the Public Health Act 1858.

The second clause of the Public Health Act, 1858, authorized the Privy Council from time to time to issue regulations "for securing the due qualification of persons thereafter to be "contracted with by guardians and overseers of unions and

" parishes in England for the vaccination of persons resident " in such unions and parishes, and for securing the efficient " performance of vaccination by the persons already or there- " after to be contracted with as aforesaid."

But the law which conferred these powers was in the first instance enacted by Parliament only for a single year; and under this restriction the authority to regulate public vaccination could not be usefully exercised by the Privy Council.

By an Act passed at the end of the last session of Parliament the provisions of the Public Health Act, 1858, were (with exception of the 8th clause) renewed and made permanent; and hereupon the Privy Council proceeded to frame certain regulations, which were issued on December 1st, 1859, and came into effect on the first day of the new year.

Of these regulations, and of other documents connected with them, a copy is hereto appended.

The circumstances to which the regulations were intended to apply, the objects which they aimed at accomplishing, and the collateral arrangements which it was necessary to make before attempting to bring them into effect, require some explanation.

By the first Act of Parliament (3 & 4 Vict., c. 29) it had been provided that vaccination at the public cost might be claimed of local authorities in any parish of England and Wales. By a second Act (necessary because poor-law guardians and overseers were to be the administrators of the first, and the expenses were to be defrayed out of poor rates) it had been provided that gratuitous vaccination should not place its recipient in the position of persons receiving parochial relief. By a third Act (16 & 17 Vict., c. 100) it had been made obligatory on parents and guardians, that every child, its health permitting, should be vaccinated within, at furthest, four months from birth; and penalties had been made recoverable from parents or guardians neglecting to fulfil this obligation.

The local arrangements made for public vaccination under the above-quoted laws have consisted in contracts entered into by the guardians or overseers with certain medical men (almost invariably the parochial medical officers) to the effect

that the latter will severally attend at appointed times and places, either by themselves or legally qualified medical practitioners as their substitutes, and will then and there duly vaccinate every resident person who applies or is brought for the purpose. These arrangements are in force throughout the whole of England and Wales; and the great mass of the population tends to avail itself of them in order to comply with the law which makes infantine vaccination compulsory.

Meanwhile, from time to time strong representations have been made that a considerable share of the current English vaccination had been of an inferior quality. Especially Mr. Marson (who for nearly 25 years has been the resident surgeon of the Small-pox Hospital, and whose opportunities of observation have therefore very greatly exceeded those of any other person in the country) has published conclusive statistics, both as to the very great frequency of sham vaccination, and as to the quantity of fatal small-pox which is due to this cause. He had found that, if vaccinated persons happen to contract small-pox, the mortality among the best vaccinated of the number would be but one-thirtieth part of the mortality among the ill-vaccinated; and yet that the latter comparatively unprotected class had so largely preponderated in his practice, that among 5,347 vaccinated persons whom he had seen suffering with small-pox, only 623 had presented the marks of what he considers thorough vaccination. In a petition on the subject which Mr. Marson addressed to the House of Commons in the summer of 1856, he stated that "the many "foreigners admitted in a series of years as patients at the "Small-pox Hospital had enabled him to observe that vacci- "nation is, as a rule, much better performed abroad than in "England,—that, in fact, it is far less satisfactorily performed "in England than in any other country in Europe;" and in explanation of this fact he remarked that "no authorized "system of vaccination had been established in England. All "persons—medical men, clergymen, amateurs, druggists, old "women, midwives, &c.,—are allowed to vaccinate in any "way he or she may think proper, and the persons operated "on are considered to have been vaccinated." Mr. Marson has published another important statement:—Besides the

terribly large proportion of patients, nominally vaccinated, whose vaccination, because of unskilfulness, has been but of partial effect, there are other cases "of frequent occurrence at "the Small-pox Hospital," where patients are in the category of non-vaccinated persons only because bungling operators have failed to vaccinate them;—"with good lymph (he says) "and the observance of all proper precautions, an expert vac- "cinator should not fail in his attempts to vaccinate above "once in 150 times. Yet a large number of those who take "upon themselves the duty think they do very well if they "succeed, however imperfectly, five times out of six, and "patients often present themselves with small-pox at the "hospital who state they have been cut five, six, eight times, "or more, for cow-pox without effect."

Far less precise than Mr. Marson's experience, but in its own way equally deserving of consideration, there had been other evidence tending to throw discredit on the quality of much current English vaccination. Among so-called prejudices against the practice there are some which represent a partial truth; erring, indeed, only in so far as they impute generally to vaccination what ought to be imputed exclusively to the vaccinator. Considerable disturbance of health has often followed—sometimes to a dangerous and even fatal extent, the improper acts of persons pretending to vaccinate. If all vaccinators equally had recognized that vaccination is not a mere easy trick of the fingers, but that precautions and minute care are necessary for its full success,—especially if all had been content to study the natural progress of the vaccine vesicle, and the different qualities of material which it furnishes at successive stages, or under accidental disturbances, of its course; if all had thus known how to select lymph and how to preserve it—had inquired into the healthiness of children proposed for vaccination, and had refrained from vaccinating during unfavourable states of health—had been careful as to the condition of children from whom lymph was to be taken, and (though only out of concession to popular belief) had refused to take lymph from unhealthy subjects, little, very little, would have been heard of "prejudices" against vaccination. These, indeed, where they exist, consti-

tute presumptive evidence that in the prejudiced locality vaccination either is, or within local recollection has been, unskilfully administered. Inquiry in such cases would very probably show, either that nominal vaccination has proved useless as a protection against small-pox, or that it has occasioned unexpected suffering to the patient; and that the origin of the scandal has (in the former case) been one of those sham vaccinations against which Mr. Marson protests, or (in the latter case) some neglect or incompetence relating to the choice or preservation of lymph, or the due preparation of the patient. And as it cannot be gainsaid that in parts of England there exist strong impressions against the value—even against the harmlessness, of vaccination, this fact must be taken as at least to some extent corroborating Mr. Marson's conclusions.

It is not possible to say, with any approach to precision, how much of the bad vaccination in England has been of official performance. Only, as it is certain that a very large excess of all vaccinations performed in England are vaccinations officially performed under contract with parochial authorities, so it is presumable that whatever statement is true of English vaccination generally, is true of parochial vaccination. But at least the doubt was of grave public importance. For surely the negative ought to be demonstrable. The law had provided a specific machinery for public vaccination; it had in effect made the use of this machinery compulsory for at least two-thirds of the population, as well as optional for the remainder; yet hitherto no security had been taken that the vaccination, so universally offered, and so extensively enforced, should be useful, or even harmless, to the recipient. Reproaches were not unreasonably addressed to the Legislature and the Government, that a poor man was compelled, under threats of penalty or imprisonment, to take his child to be vaccinated, and virtually by some particular vaccinator; but that the vaccination which he was thus obliged to accept might, for aught that the law had provided, be good, bad, or indifferent.

Two other considerations gave increased weight to this argument. On the one hand, it was notorious that great

laxity prevailed among parochial vaccinators as to their privilege of acting by deputy; and that often a vaccinator, instead of adhering in this respect to the terms of his contract to act "either by himself or by some fully qualified medical "practitioner as his substitute," would permit his duty to be performed by assistants or pupils possessing no legal qualification to practise. On the other hand, it was certain that, in the existing state of the law, a person might be appointed parochial vaccinator who had no sufficient knowledge of vaccination,—in fact, even a person who had never seen a vaccination performed, nor ever observed a vaccine vesicle during its course; for it was a natural consequence of the arrangements of public vaccination in this country, that, generally speaking, our ordinary schools of medicine could have no means of practically teaching vaccination, nor hitherto had any of the public vaccinating-stations been opened as schools for the purpose; and accordingly a medical student might complete his studies, and obtain his diploma or licence for practice, without having had any convenient opportunity of learning to vaccinate. His possession of such opportunities would commonly have been contingent on his residing during his pupilage in the house of some surgeon-apothecary; and in this case the value of his opportunities might, according to circumstances, have been great or little. For the absence of such practical opportunities nothing else could compensate; not because vaccination, as regards the mere manipulation with the lancet, requires much special study; but because to know well the results of vaccination, especially to know well and practically the characters of a vesicle from which it is right to take lymph, requires that cases of vaccination, skilfully performed, should have been attentively observed during their course.

Such were the circumstances under which the Privy Council was called upon to frame regulations "for securing the due "qualification of persons to be hereafter contracted with by "guardians and overseers of unions and parishes in England "for the vaccination of persons resident in such unions and "parishes, and for securing the efficient performance of vac-"cination by the persons already or hereafter to be contracted

" with as aforesaid." And the main objects to be aimed at were evidently these:—

1) that no one should hereafter be admissible as a contractor for vaccination without producing evidence that he had sufficiently studied vaccination;

2) that no one should hereafter be allowed to act as deputy for any present or future contractor without possessing the same qualifications as are required of contractors themselves;

3) that the contractor should be bound in every essential particular to vaccinate with all such precautions as are known to be necessary for fully and safely attaining the desired result.

There was one real difficulty in making regulations for the fulfilment of these objects,—the difficulty, namely, of procuring satisfactory evidence that the candidate for a vaccination-contract or deputyship really had learnt the business which he wished to undertake. The ordinary apparatus of medical diplomas and licences was here inapplicable: for the various licensing corporations in England have neither the habit nor the means of practically inquiring whether their respective candidates have gained a proper knowledge of vaccination; and hitherto, as already stated, there existed no schools where vaccination could be duly learnt, and whence certificates of proficiency could be received. Accordingly, if the intentions of the Legislature were to be fulfilled, it was preliminarily needful that special establishments should be organized, where vaccination could be studied under skilled guidance, and whence candidates, after due instruction or examination, could obtain such certificates of proficiency as would show them qualified to be contracted with (provided they had the necessary professional licences) for the performance of public vaccination.

With these explanations, the following papers, issued by the Privy Council in December last, represent the proceedings now reported on:—first, the Order and appended Instructions, relating to the qualification of contractors, the qualification of deputies of contractors, and the manner in which contracts shall be fulfilled; secondly, the Notification and appended Memorandum, stating the provisions which have been made

for enabling all future candidates to acquire the knowledge of vaccination, and the certificate of such knowledge, which henceforth are necessary for rendering them eligible to be contracted with.

In reference to the Instructions for Vaccinators under Contract, it is satisfactory to state that they were framed after extensive consultation with persons most eminent in the subject; especially that in every particular they were minutely discussed with Mr. Ceely of Aylesbury and Mr. Marson of the Small-pox Hospital, the two highest authorities in this country on all to which the Instructions relate; and that these gentlemen (whose kind assistance is very gratefully acknowledged) concurred in recommending them in their present form. The National Vaccine Board has also, with much care, considered the Instructions, and has adopted them for the purposes of its Establishment.

ORDER.

VACCINATION. Privy Council Order to Guardians and Medical Practitioners in 1859.

To the Guardians of the Poor of all Unions and Parishes, to the Churchwardens and Overseers of all Parishes, Townships, and Places in which the Relief to the Poor is not administered by Guardians, in England and Wales, and to all Medical Practitioners.

WHEREAS by the Public Health Act, 1858, and by an Act since passed to perpetuate the same, it is enacted that the Privy Council may from time to time issue such regulations as they think fit, for securing the due qualification of persons to be thereafter contracted with by Guardians and Overseers of Unions and Parishes in England for the Vaccination of persons resident in such Unions and Parishes, and for securing the efficient performance of Vaccination by the persons already or thereafter to be contracted with as aforesaid;—

Now, therefore, it is hereby ordered, by the Lords and others of Her Majesty's Most Honourable Privy Council (of whom the Vice President of the Committee of the said Privy Council on Education is one) that on and after the first day of January, 1860, the following Regulations shall be in force, viz.:—

1. Except where the Privy Council, for reasons brought to their notice, see fit in particular cases otherwise to allow, no person shall in future be admitted as a Contractor for Vaccination unless he possess the same qualifications as are required by the Orders of the Poor Law Commissioners as qualifications for a District Medical Officer, and produce a special Certificate, given, under such conditions as the Privy Council from time to time fix, by some public Vaccinator whom the Privy Council authorize to act for the purpose, and by whom he has been duly instructed or examined in the practice of Vaccination, and all that relates thereto;—

but the production of this special Certificate on occasion of the contract being made may be dispensed with, if the certificate, or some other which the Privy

Council judge to be of like effect, have been among the certificates or testimonials necessary for obtaining any diploma, licence or degree, which the candidate possesses;—

and also, in respect of persons legally admitted to practise before this regulation comes into effect, the special Certificate may be dispensed with, on condition that the Contract, during one year from its making, continue subject to the approval of the Poor Law Board;—

and all persons now contracted with shall be deemed to be qualified to be again contracted with.

2. Under the same conditions as are appointed for the admission of a Contractor, any person qualified to be a Contractor may, on the Contractor's application, be admitted by the Guardians or Overseers to act as his occasional deputy;—

but, if this admission be not part of the original Contract, it must be notified by indorsement upon the Contract; and at least 15 days before it is intended to take effect, a copy of the proposed indorsement, together with all requisite evidence of the qualification of the person whom it is proposed to admit, must be transmitted to the Poor Law Board.

3. All Vaccinations and Inspections under Contract shall be performed by the Contractor in person, or by some other Contractor of the same Union or Parish acting for him, or by a deputy, duly admitted as above;—

but at any station where the Contractor is authorized (as above) to grant certificates, pupils and other candidates, aged not less than 18 years, may, in his presence and under his direction, take part in vaccinating.

All Vaccinations and Inspections under Contract shall be performed in accordance with the annexed "Instructions for Vaccinators under Contract."

4. Until some new form of Vaccination-Register be duly prescribed, the person who performs any Vaccination under Contract shall, on the day when he performs it, legibly write in his Register (as now provided) the letter R (for Re-vaccination) against the name of every person, adult or adolescent, who, having in early life been successfully vaccinated, is re-vaccinated; and shall also enter in some column, or in the margin of the Register, the source whence the lymph used in the vaccination was obtained;—

thus: the name, or number (if any) in the Register, of the subject from whom the lymph was taken; or "N.V.E.," if the lymph was sent by the National Vaccine Establishment; or the name or description of any other source;—

and where the Vaccination or Inspection is done by a person acting as Deputy for the Contractor, the Deputy shall write the initials of his name in the Register side by side with the entry of the case; viz., in the left margin of the page, if it be a Vaccination which he performs, or in the right margin of the page, if it be an Inspection which he performs.

5. Guardians and Overseers, in their respective Unions and Parishes, shall forthwith take measures to bring the performance of public Vaccination into conformity with these regulations.

Instructions for Vaccinators under Contract.

Vaccination. Instructions for Vaccinators under Contract in 1859.

(1.) Except there be immediate danger of small-pox, vaccinate only subjects who are in good health. Satisfy yourself that there is not any eruption behind the ears, or elsewhere on the skin; nor any febrile state; nor any irritation of

the bowels. Under no circumstances vaccinate a subject to whom, from the state or prospect of his health, vaccination is likely to prove injurious. Do not re-vaccinate persons who in infancy have been efficiently vaccinated, unless they be more than 15 years of age, or, if during any immediate danger of small-pox, more than 12 years of age.

(2.) In all ordinary vaccinations, vaccinate by four or five separate punctures, so as to produce four or five separate good-sized vesicles; or, if you vaccinate otherwise than by separate punctures, take care to produce local effects equal to those just mentioned.

(3.) Direct care to be taken for keeping the vesicles uninjured during their progress, and for avoiding afterwards the premature removal of the crusts.

(4.) Register the results of vaccination only after having yourself inspected the cases. Register as "successful" no case of primary vaccination, unless the course of the vesicle have been strictly regular according to the subjoined description A.;* and register as "successful" no case of re-vaccination, unless either the regular vaccine vesicle have ensued, or the results have been normally modified according to the subjoined description B.* Or, if in either case you register as "successful" any result which does not agree with the subjoined descriptions, write also the word "irregular" in the column of the register where you record the result.

(5.) Endeavour to maintain in your district such a succession of cases as will enable you uniformly to vaccinate with liquid lymph directly from arm to arm; and do not, under ordinary circumstances, adopt any other method of vaccinating. To provide against emergencies, always have in reserve some stored lymph;—either *dry*, as on thickly-charged ivory points, constantly well protected from damp; or *liquid*, according to the method of Dr. Husband of Edinburgh, in fine, short, uniformly capillary (not bulbed) tubes, hermetically sealed at both extremities. Lymph successfully preserved by either of these methods may be used without definite restriction as to time; but with all stored lymph caution is necessary, lest in time it have become inert, or otherwise unfit for use. If, in order to vaccinate with recent liquid lymph, you convey it from case to case in a vial or in other like manner, without its being hermetically sealed, do not let more than 18 hours, and in very hot weather not more than 12 hours, intervene before it is used.

(6.) Consider yourself strictly responsible for the quality of whatever lymph you use or furnish for vaccination. Take lymph only from subjects who are in good health; especially satisfying yourself that they are free from eruption on the skin. Take it only from well-characterised, uninjured vesicles. Do not take it from cases of re-vaccination. Take it (as may be done in all regular cases on the day week after vaccination) at a time when the vesicles are plump, either just before the formation of the areola, or, at the latest, not more than 24 hours after the areola has begun to form.

(7.) In vaccinating from arm to arm, and still more in proceeding to store lymph, avoid draining any vesicle which you puncture. From such a vesicle as vaccination by puncture commonly produces do not, under ordinary circumstances, take more lymph than will suffice for the immediate vaccination of five subjects, or for the charging of seven ivory points, or for the filling of three capillary tubes; and from larger or smaller vesicles take only in like proportion to their size.

* The references are to "Signs of Successful Vaccination and Re-vaccination" (Gregory revised by Ceely and Marson) which form part of the Appendix.—Ed.

(8.) Scrupulously observe in your inspections every sign which tests the efficiency and purity of your lymph. Note any case wherein the vaccine vesicle is unduly hastened or otherwise irregular in its development, or wherein any undue local irritation arises; and if similar results ensue in other cases vaccinated with the same lymph, desist at once from employing it.

(9.) If from any cause your supply of lymph ceases, or becomes unsuitable for further use, take immediate measures for obtaining a new supply.

(10.) Keep in good condition the lancets or other instruments which you use for vaccinating, and do not use them for other surgical operations.

N.B.—Supplies of lymph, guaranteed by the National Vaccine Board, are furnished on application to all medical practitioners. Letters of application for this lymph should be addressed "To the Registrar of the National Vaccine Establishment, Privy Council Office, London, S.W."

NOTIFICATION.

Notice issued in 1859 of arrangements for granting certificates of proficiency in Vaccination.

Whereas under the provisions of the Public Health Act, 1858, and of an Act since passed to perpetuate the same, the Privy Council have this day issued Regulations "for securing the due qualification of persons to be hereafter contracted with by Guardians and Overseers of Unions and Parishes in England for the Vaccination of persons resident in such Unions and Parishes, and for securing the efficient performance of Vaccination by the persons already or hereafter to be contracted with as aforesaid;" *and whereas* in these regulations it is, among other things, required, that, on and after the first day of January, 1860, persons to be contracted with for Vaccination, and persons to be allowed to act in their stead, shall, except in certain cases, produce evidence of being duly qualified in all that relates to the practice of Vaccination, *which evidence* must consist in a certificate given, after due instruction or examination, by some public Vaccinator whom the Privy Council authorise to act for the purpose;

Notice is hereby given,—(1) That, subject to Orders of the Privy Council, the public Vaccinators named in a printed list are authorised by the Privy Council to give the required certificates of proficiency in Vaccination to persons whom they have instructed therein, and those whose names are in the printed list in italic letters are also authorised to give such certificates after examination to persons whom they have not themselves instructed.

(2) That from and after the first day of January, 1860, the vaccinating stations, at which these Vaccinators officiate, will be open under conditions set forth in the annexed memorandum, for the purposes of teaching and examination; and,

(3) That from time to time, as additions are made by the Privy Council to the list of persons whom they now authorise to give certificates of proficiency in Vaccination, the names of the other persons thus authorised will be published in the *London Gazette.*

MEMORANDUM of ARRANGEMENTS made in ENGLAND for the PUBLIC TEACHING of VACCINATION, and for the granting of such CERTIFICATES of PROFICIENCY in VACCINATION as will qualify the bearers (if otherwise eligible) to be contracted with by GUARDIANS and OVERSEERS for the PERFORMANCE of the PUBLIC VACCINATION.

Memorandum of arrangements in 1859 for granting certificates of proficiency in Vaccination.

The stations at present established for educational purposes are all in places where there are recognized medical schools. They are stations where the appointed public vaccinator uniformly attends in person, and where the annual number of vaccinations, as compared with the number of vaccinating days, is sufficiently large to promise that the student during his period of attendance, will, as a rule, always find many cases together for observation. They are stations from which vaccine lymph is furnished for the public service; the Vaccinators in charge of them having, for this purpose, been selected by the National Vaccine Board to be Members of the National Vaccine Establishment.

The Vaccinator of an educational vaccinating station, during his attendance thereat, will exhibit and explain the course and characters of the vaccine vesicle, will practically teach the best method or methods of performing Vaccination, and of taking lymph for present or future use, will inculcate all precautions which are necessary with regard to the health of subjects proposed for Vaccination, and with regard to the selection and preservation of lymph, and will give all such other instruction as is requisite for the scientific and successful performance of Vaccination and Re-vaccination. During his course of instruction, he will make provision to ensure that always some cases come for inspection on the 10th, as well as on the 8th day; and, for the purpose of showing these cases to his pupils, he will give, on the day appointed for their coming, a second weekly attendance at his station. He will further enable and direct each pupil to see at least six cases of vaccination on at least two other days of their progress, viz., both before the 8th and after the 10th day. In the Teacher's presence, and under his direction, any Pupil, aged not less than 18 years, may take part in vaccinating; but not till he have attended the station on at least two vaccinating-days.

Any person desirous of being admitted as pupil at an educational vaccination-station, shall pay a fee not exceeding one guinea, and thereupon receive a ticket entitling him to attend the public vaccinations of the Teacher. When the Pupil has attended at the station, during the times of vaccination and teaching, for at least six weeks, the Teacher, if satisfied of his proficiency, shall, on receiving back his ticket, but without further payment, give him a certificate in the appointed form.

At stations where the Teacher is also authorized to give certificates of proficiency in vaccination to persons whom he has not himself instructed therein, such persons will, on appointed occasions, be examined by the Teacher, on payment of a fee not exceeding one guinea, and if he find them competent, receive certificates accordingly. In case of failure to pass this examination, the Candidate may be admitted to a second examination on payment of a fee not exceeding half a guinea.

The Certificate of Proficiency will be understood to imply—and therefore the Teacher who signs it will have taken care to ascertain, that the person to whom it is given can skilfully vaccinate, both with liquid lymph (including such as is preserved in capillary tubes) and also from ivory points;—that he can properly

charge ivory points or capillary tubes with lymph;—that he is aware of the relative advantages of recent and preserved lymph, and of all precautions which are requisite in using the latter;—that, from among vaccinated subjects presented for eighth-day inspection, he can select and give reasons for preferring, those who are fittest to furnish lymph;—that, besides being thoroughly familiar with all local changes which, from first to last, normally ensue on vaccination, he has learnt what causes may accelerate or retard the local changes, or give them undue severity, or otherwise render them irregular;—that he is well-informed as to the constitutional effects of vaccination (including the eruptions which sometimes follow it) and as to the treatment which cases of vaccination, under various circumstances, may require;—that he knows how far the protective influence of vaccination is affected by lapse of time, and how far by the mode in which vaccination is performed—especially by the number or size of vesicles, and knows generally under what circumstances re-vaccination is to be recommended;—finally that he is acquainted with the laws and regulations relative to public vaccination, and understands the local arrangements which are necessary for maintaining a constant supply of lymph.

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2. *Proceedings relating to the Supply of Vaccine Lymph.*

Supply of Vaccine Lymph.

The Public Health Act, 1858, requires the Privy Council to direct the application of "any money from time to time provided by Parliament for or towards defraying the expenses "of the National Vaccine Establishment, or otherwise providing for the supply of vaccine lymph." And, apart from this requisition, it is of course indispensable for the efficiency of public vaccination in England, that constant regard should be had to the quality of lymph which is in use at parochial stations.

In the last Annual Report it was stated that proceedings had recently been commenced by the National Vaccine Board for the purpose of putting the national supply of lymph on a securer basis than it then possessed. During the past year these proceedings have continued in accordance with the principles then adverted to. Unproductive metropolitan stations of the Vaccine Establishment have been discontinued; and, in proportion to their discontinuance, new sources of contribution have, after inspection under the Privy Council, been opened at large provincial towns, and at some parochial stations in London. As the changes are still in progress, it may be convenient to defer to some future opportunity an account of the new organization; except in so far as the proceedings may

be gathered from the report of the National Vaccine Board. (Appendix, No. 1.)

Other questions of importance in relation to the national lymph supply have been under consideration during the year.

It is greatly to be desired in a system of public vaccination, that localities should not be too dependent on central assistance; that each vaccinator should, as a rule, be able to maintain in his district such a succession of cases as will enable him habitually to vaccinate with liquid lymph directly from arm to arm; that, against emergencies, he should always have in reserve some stored lymph; and that, under these arrangements, he should but very rarely have occasion to address the Vaccine Board for a supply. But, for the attainment of this object, certain local conditions are necessary; and these conditions have hitherto been very imperfectly realized. The foremost evil has been, that, under an injudicious application of the Vaccination Act of 1853, the performance of public vaccination has been subdivided to an extent which leaves comparatively few vaccinators able to maintain their respective successions of lymph. This evil—not confined to rural districts, where sometimes it could not easily be escaped, but abundantly prevailing in large towns (where no trace of it ought ever to exist) and not least in the metropolis, has been of such magnitude as seriously to endanger the efficiency of vaccination in England. Unfortunately it does not admit of immediate complete cure; but the principles on which it must be dealt with are sufficiently obvious and can easily be made the basis for future arrangements throughout the country. For the attainment of this object it appeared less expedient that the Privy Council (at least at present) should issue a special regulation, than that the Poor Law Board should promote the necessary changes; partly as opportunities arise, by the exercise of its authority over future contracts, and partly by general recommendations addressed to the contracting parties. Accordingly a Memorandum on the subject was communicated by the Privy Council to the Poor Law Board, and of this memorandum a copy is subjoined.

In intimate connexion with the object of these considerations, is that of promoting a better knowledge of the modes in which vaccine lymph may be stored against times of scarcity. And for this object it appeared desirable to inquire into the merits of a method hitherto little practised in England,—the method of preserving lymph, in a liquid state, within fine, short, uniformly capillary (not bulbed) tubes, hermetically sealed at both extremities. This procedure is extensively practised in Edinburgh by Dr. Husband, the Vaccinator of the Public Dispensary, and, on his plan, by other practitioners in Scotland. But it seems that in England some prejudice has existed against it; partly perhaps because it has been confounded with the entirely different plan of storing lymph in bulbed tubes (within which it is liable to decomposition) and partly perhaps because the procedure requires to be conducted with more care than is necessary for the common English procedure of charging ivory points with lymph, which is then to be let dry upon them. The alleged advantages of Dr. Husband's plan (especially where lymph has to be conveyed into hot climates) appeared of so much importance, that the Privy Council ordered inquiry to be made into their reality. This inquiry was conducted by Mr. Ceely, of Aylesbury; whose report on the subject, together with details furnished by Dr. Husband on the particulars of his method, is hereto subjoined.* The advantages of the method (subject, of course, to its being adopted with all necessary precautions) are quite conclusively established. Mr. Ceely saw perfect results obtained by vaccination with specimens of lymph which had been thus preserved in a liquid state for as many as seven years. And with the knowledge thus obtained, it was thought right to introduce into the "Instructions for Vaccinators under Contract" a special mention of Dr. Husband's procedure; so as to give the contractor his choice, whether to preserve lymph by this method, or by the more generally-used method of ivory points.

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* [The important reports of Mr. Ceely and Dr. Husband, which, like the many other reports appearing in the Appendices, frequently referred to in these reports, are not reprinted in these volumes.—Ed.]

Memorandum on the Subdivision of Public Vaccination, as affecting the Supply of Lymph.

Memorandum of Privy Council in 1859 on the subdivision of Public Vaccination as affecting the supply of Lymph.

There is reason to believe that the performance of Public Vaccination in England is disadvantageously affected by its present extreme subdivision.

For the satisfactory working of a public vaccinating-station, it is requisite that systematically on each vaccinating day two groups of cases should assemble there;—on the one hand infants, who, having been vaccinated on the day-week preceding, are now (as the law requires) brought back for inspection, and are ready to furnish the vaccinator with lymph for his present proceedings;—on the other hand infants brought for Vaccination, who, if now vaccinated, will on the day-week following be brought back for inspection, and then in their turn contribute lymph for the benefit of further applicants. By the coming together of these two groups of cases, the Vaccinator is enabled to vaccinate from arm to arm; a mode of proceeding, which (as a rule) is of great importance to his success.

It is also requisite that each group of cases should not be too restricted in number. The careful Vaccinator does not indifferently vaccinate from the arms of all infants brought back on the eighth day, but exercises selection among them; and facility for this selection cannot be afforded him, unless there be on each vaccinating day an average return of several vaccinated cases. If his share of the local Vaccination be either too small or too much subdivided among different stations and different days, the cases returning to him for eighth day inspection will on many vaccinating days be too few for his purpose. On all such occasions, he must either omit to vaccinate those who apply to him, or (unless he have recourse to less eligible sources) must vaccinate them with preserved lymph, and incur the much greater chances of failure which belong to the usual modes of thus vaccinating.

Ill-frequented vaccinating-stations (stations, that is to say, where the total number of vaccinations, as compared with the number of vaccinating-days, is too small for the local lymph-supply to be continuously and properly maintained) are now a very prominent feature in our system of public Vaccination. And this state of things is one of serious consequence; not only as implying that at present a large proportion of the vaccinations in England are performed under disadvantageous circumstances; but also because, if it continue, the general lymph supply of England can scarcely fail to become insufficient or deteriorated.

The excessive subdivision which leads to this result, arises in various ways. Sometimes, no doubt, the quantity of Vaccination to be performed within one jurisdiction has been divided among too many performers. But still oftener it is the case, that individual Vaccinators have distributed their respective shares of the public duty among too many stations, or too many vaccinatiug days; and in some cases the Vaccinator developes the inconvenience to its greatest extent by almost or entirely disusing the appointed station, and habitually performing his vaccinations under contract at the several private dwellings of his patients; a mode of proceeding, which in thinly-populated rural districts may be convenient and even necessary, but which in town-districts can never be necessary, and scarcely ever can fail to be disadvantageous.

It cannot be questioned but that Local Authorities, in adopting the arrangements here animadverted on, have been actuated by the very laudable intention

of giving the utmost possible facility to persons desirous of being vaccinated. To any one who has not studied the subject, it naturally appears that the greatest facilities for Vaccination must be given by the largest number of stations, and the largest number of surgical attendances there; whereas in fact (from circumstances which have been here explained) any multiplication of attendances beyond a certain point, can only give spurious facilities for its purpose; and public Vaccination in a district may often be difficult or inefficient, merely because the stations are too numerous or the attendances at them too frequent.

The inconveniences adverted to are not altogether removable. In rural districts, from obvious and unavoidable causes, it never can be as easy as in populous towns to maintain effective Vaccination at one common centre; and in many of such districts the Medical Officer exercises a wise discretion in vaccinating, as opportunities offer, at the scattered dwellings of his patients. Again in instances where small-pox breaks out among a population which presents considerable illegal arrears of Vaccination, the emergency, while it lasts, requires exceptional arrangements.

Exception being made of these, and perhaps other special cases, it seems certain that the Public Vaccination of England would be greatly improved by judicious consolidation of its present too diffuse arrangements. And to effect this object, it seems desirable that Guardians and Overseers, where there is no special reason to the contrary, should regulate the details of their respective Contracts in uniformity with the following General Rules:—

(1) that, except at times when there is immediate danger of small-pox, Vaccination be not appointed to be performed at any station oftener than once a week:

(2) that, except at times when there is immediate danger of small-pox, or for special reason in individual cases, Vaccination in town-districts (unless it be of private patients) be performed only at the Public Station:

(3) that, as opportunity offers, especially in urban Unions and Parishes, all unnecessary sub-division of public Vaccination among many districts or stations be discontinued; and that in populous towns, unless under special circumstances, sub-division be not made beyond the point where each vaccinating-station will have annually at least 500 applicants for Vaccination.

[**From the Third Report, 1860.**]

II.—The Working of the Vaccination Laws, and of the Regulations and Arrangements made with Regard to them.

II. Vaccination.

From the preceding section of this Report it will have appeared that proceedings which were taken during 1860 with reference to epidemics of small-pox necessarily threw light on the state of vaccination in the inspected districts; and it will have been seen that, as a rule, the working of the Vaccination Extension Act of 1853 was found to be most unsatisfactory.

Inquiries made in 41 Unions.

But, apart from present epidemics of small-pox, the working of the vaccination-laws needed to be inquired into. For this purpose, and particularly with regard to the observance of those Regulations which, under the Public Health Act, have been made (by order of Privy Council, dated December 1st, 1859) for the improvement of public vaccination, their Lordships have seen fit, in the past year, to direct the commencement of a *systematic inspection*. The commencement was made in Unions where the amount of infantine vaccinations, in comparison with the number of births, appeared to be specially low; and the instructions, which under their Lordships orders I gave for the conduct of the inquiry, were such as I thought might best serve to elicit the various local explanations of this apparent non-compliance with the law.

First, were the facts really as they appeared? Was it the fact, notwithstanding the law that every child (its health permitting) shall be vaccinated within, at farthest, four months from birth,—was it the fact, that Union after Union could be named where the number of infantine vaccinations did not reach a third of the number of births, sometimes not even a sixth or an eighth?

If so, where was the fault? Did the local arrangements not give such facilities as the law requires to be given to persons

willing to have their children vaccinated? Did the local authorities omit to publicly notify these arrangements? Did the local registrar not duly deliver to persons registering births the notice which reminds them of their obligation to have the infant vaccinated? Was the local vaccination-register imperfectly kept, so that the defaults of infantine vaccination could not be readily discovered? Were there, in the local contracts for vaccination, any conditions which would tend to defeat the object of the law? Or, not least, was there in the local style of vaccination, as performed by the contractors, any fault or slovenliness which could create a public prejudice against vaccination?

Such, in substance, were the questions which had to be solved by local inquiry. And, in answer to them, so far as they have yet been answered, I append *in extenso* the report which has been made to me by Dr. Seaton with respect to 152 vaccination districts comprised in the 41 Unions hitherto inspected by him under these instructions. (Appendix, No. IV.)

I have already had occasion to report the conclusion, to which the results of this inquiry have largely contributed, that the present law—"to extend and make compulsory the "practice of vaccination"—is so imperfect, as to be, for its professed objects, almost inoperative. Of course where it appeared, on local investigation, that non-compliance with the law depended simply on the non-compulsiveness of the law, it was impossible to suggest any present mode of conquering the difficulty. But, where it appeared that other causes were at work,—where it appeared that the law, through some defect of plan or execution in the local arrangements for public vaccination, was rendered less operative than it might be, this was pointed out to the local authorities or their officers, and advice was given them how they might best proceed to render their plans and proceedings more conformable to the intentions of the law. It affords me the greatest satisfaction to report, with respect to these communications, that universally the inspection was welcomed as an assistance given by the Privy Council to local authorities in a matter of

much difficulty; and that, even where criticism of local proceedings had to be expressed, every willingness was shown to make the suggested amendments.

As regards the observance of those Regulations of the Privy Council, which were established by their Lordships' Order of December 1, 1859, and came into effect on the first day of 1860, for the improvement of public vaccination, it would be premature on this occasion to say more than that the regulations seem to be operating usefully. It was occasionally found that, in consequence of them, very desirable improvements had already been locally made, sometimes in the manner of vaccinating, sometimes otherwise in the discharge of a contractor's duties. It was evident, however, that the observance of the Regulations would be, perhaps for years, comparatively imperfect, unless their adoption were promoted by the kind of inspection here reported on. For, with regard to detailed arrangements and proceedings (which, after all said and done, must necessarily in great part remain affairs of local discretion) the influence of formal printed regulations can never be more than a miserable substitute for local intelligence, education and zeal. And the great advantage of the inspections which are here reported on,—inspections which their Lordships propose to continue systematically through the other Unions of England, is, that by means of them the spirit and intentions of their Lordships' Order are made clear to those who have to carry the Order into effect; that explanations or reasons are given where they are wanted; and that consideration is directed to points which before have been overlooked.

In illustration of my meaning, I cite a single instance. Among the *Instructions for Vaccinators* is the following direction:—"In all ordinary vaccinations, vaccinate by four "or five separate punctures, so as to produce four or five "separate good sized vesicles; or, if you vaccinate otherwise "than by separate punctures" [for some vaccinators prefer to make long slight scratches, side by side, or intersectingly, instead of punctures] "take care to produce local effects "equal to those just mentioned." Obedience to this instruc-

tion is necessary for conferring on those who are vaccinated the full amount of protection which good vaccination confers. Therefore the inspector was charged always to ascertain whether the direction was obeyed; and, in case of negative finding, he was to bring to the knowledge of the vaccinator certain facts which I have here tabulated. He reports:—

"To most of the vaccinators the conclusive evidence of the "superior value of several vesicles derived from the records "of the Small-pox "Hospital, was un- "known. My commu- "nication with them "enabling me to lay "before them the "facts collected by "Mr. Marson, which "I had had printed "in a convenient "form, and to ex- "plain fully the plan "of vaccinating pur- "sued with perfect "safety at the large "stations of the "national establish- "ment, it was a great "pleasure to me to "find that the result "of the free and "ample consideration "and discussion of "these points re- "sulted always in "the assurance that the mode enjoined in the instructions "would henceforth be adopted."

STATISTICAL EVIDENCE of the different Degrees in which Persons Vaccinated in different ways will be safe against Death by SMALL-POX, if they should happen in after-life to contract this Disease.

The Table is founded on information given to the Medical Officer of the Privy Council by Mr. Marson, Surgeon of the Small-pox Hospital, as the result of observations made during 25 years in nearly 6,000 cases of post-vaccinal small-pox.

Cases of Small-pox, classified according to the Vaccination Marks borne by each Patient respectively.	Number of Deaths per Cent. in each Class respectively.
1. Stated to have been vaccinated, but having no cicatrix - -	21¾
2. Having *one* vaccine cicatrix*	7½
3. Having *two* vaccine cicatrices†	4⅛
4. Having *three* vaccine cicatrices	1¾
5. Having *four or more* vaccine cicatrices - - - -	¾
Unvaccinated - - - -	35½

* Among cases in which the one cicatrix was *well marked*, the death-rate was 4¼. Among cases in which it was *badly marked*, the death-rate was 12.

† Among cases in which the two-cicatrices were *well marked*, the death-rate was 2¾. Among cases in which they were *badly marked*, it was 7¼.

As regards another clause in the above-mentioned *Instructions*, and as regards some urgent recommendations addressed for the same purpose by their Lordships to local authorities,

the inspector's report contains valuable information. The instruction I refer to is :—" Endeavour to maintain in your " district such a succession of cases as will enable you uni- " formly to vaccinate with liquid lymph directly from arm " to arm, and do not, under ordinary circumstances, adopt " any other method of vaccinating." And the recommendations to which I refer are comprised in a memorandum (given, with explanations, in the last annual report) on " the Sub- " division of Vaccinating Stations as affecting the Supply of " Lymph." The importance of making such local arrangements as will enable the vaccinator habitually to vaccinate from arm to arm, instead of having recourse to dry lymph, is well illustrated by the following passages of the inspector's report :—" The register of one vaccinator whose common " practice it was to use dry lymph, showed 46 failures in 240 " vaccinations. Another vaccinator who, during last summer, " vaccinated 200 cases, most of them at the people's houses " with recent dry lymph on points, but some of them direct " from the arm, said that he had had altogether between 20 " and 30 failures, not one of which had been in the cases done " from the arm ; and most vaccinators, without being able to " make any numerical statement, spoke of frequent failures " with dry lymph. Success, when attained, was in most " instances only partial. A vaccinator whose habit it was to " insert lymph by puncture in six places, told me he seldom " got more than one or two vesicles ; another, operating by " abrasion in three places, said he got sometimes three, some- " times two, more often one only ; and the testimony was " very strong and general that a vesicle could not with con- " fidence be looked for from each puncture or insertion of " lymph . . . I met with many illustrations of the paramount " importance of so conducting vaccination as to secure, as far " as possible, the success of the operation. Of the elder " children in schools, whom I have enumerated among the " unvaccinated, there were many who assured me they had " been cut, and some of them more than once, and that it " would not take ; and they seemed to be under the impres- " sion that it would be of no use vaccinating them any more.

" Some of the children marked with small-pox in the schools
" said also they had been vaccinated, 'but it would not take.'
" Small-pox had been introduced into one village by a child
" who had been vaccinated three times unsuccessfully. And,
" on other inquiries, I have met with several cases of death
" from small-pox in children said to have been vaccinated,
" but whose vaccination it appears on investigation, had not
" been successful."

Finally, I have to quote from the inspector's report one large set of facts which will show how much remains to be done for the improvement of English vaccination, and how poorly Jenner's countrymen are protected against small-pox, in comparison with that protection which his discovery might confer on them. The inspector " examined carefully " the arms of 12,349 children in various national, parochial " and charitable schools, including 397 children in work-" houses." The result of this large scrutiny may in round numbers be thus stated:—Of every 12 children examined, 2 would show *no conclusive mark* of having been vaccinated; 3 others would show only such marks as imply *a very imperfect protection* against small-pox; 4 others would have marks which are classed as *passable*; only 3 would be, in the inspector's opinion, *well*, and *very well* protected.

2. Educational Vaccinating-stations.

I have to add, that during the year the educational vaccinating-stations which came into action on the first of January 1860 have been specially inspected. They were found in satisfactory work. A list of them will be found in the Appendix, No. V. And, for particulars relating to their establishment, I refer to my last year's Report.

3. Public supply of vaccine lymph.

It is not by immediate action of the Privy Council, but by means of a separate Board (that of the National Vaccine Establishment) that the *public supply of vaccine lymph* is maintained and distributed. Yet as, under the Public Health Act, the Privy Council is charged with directing the application of such monies as are for that purpose voted by Parliament, it may be convenient that now, as on former occasions, I should refer to the present state of this important branch of the public sanitary service.

In making my first annual report (that relating to the year 1858) I had occasion to regret the then insecure state of the national supply of vaccine lymph; and I described certain new arrangements which were then being commenced, with a view of putting the supply on a more satisfactory footing. Referring to that report for a detailed account of the then existing circumstances, I need at present only state this as its substance;—that for the maintenance of a supply of vaccine lymph, the public looked to the Board of the National Vaccine Establishment; that this Board depended for lymph exclusively on the vaccinations performed at its own 17 stations in the metropolis; that the number of applicants for vaccination at these stations had been long undergoing a decrease,* in proportion as successive Acts of the legislature had created and developed the parochial system of public vaccination; that, meanwhile the public demands for lymph were increasing;† and that now the Board could no longer guarantee from its own stations the continuance of sufficient means for satisfying such demands. And the arrangement which in 1858 was proposed in order to obviate the threatened scarcity of lymph was, that the Board should enter into correspondence with certain independent vaccinating-stations (parochial and other) and should with due precaution obtain lymph from these

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* *See* the first of the annexed four tables (Appendix) particularly the reductions shown after 1840–1 and after 1853. In 1838 the number of vaccinations performed by the establishment amounted to 18,659; during the three years 1850–2, the average annual number was only 10,713; during the three years 1854–6, it had fallen to 8,207; and in 1858 it reached but 6,445. To this reduced number of vaccinations, 17 different stations in the metropolis contributed in unequal proportion: two of them together effecting 3,502 vaccinations, or considerably more than half of the total; while the remaining 15 contributed various numbers, varying respectively from 72 to 373. At some of these 15 stations vaccination was offered to the public twice, at others, three times a week; but from an analysis of their statistics, it appeared that the average number of cases vaccinated at each of them on each vaccinating day was only about $1\frac{1}{2}$.—J.S.

† Ordinarily the National Vaccine Establishment was distributing about 215,000 charges of lymph; but under the influence of peculiar circumstances, the demand had risen and might rise again to about 320,000—an amount nearly 60 per cent. higher than was supplied in 1838, when the sources of supply (i.e. the vaccinations performed by the establishment) were nearly three times as numerous as in 1858.—J.S.

subsidiary sources. This was the state of things reported on in my first annual report.

In the next report (that relating to the year 1859) I was able to show that considerable progress had been made towards developing this better system. Unproductive metropolitan stations of the Vaccine Establishment had been discontinued; and, in proportion to their discontinuance, new sources of contribution had been opened at large provincial towns and at two parochial stations in London.

On the present occasion I am able, with great satisfaction, to report the well-established success of the new arrangements. During 1860 the National Vaccine Board received two-fifths of its lymph-supply from sources thus recently called into existence. The public supply, instead of depending on fewer than 6,500 vaccinations, is now based on nearly 14,000; and we have the advantage of knowing, not only that the new sources could in case of sudden need furnish much more lymph than they now currently supply, but that, on the same plan as that on which they contribute lymph, other parochial stations might at any moment be brought into correspondence with the National Vaccine Board, and be made instrumental in widening more and more the basis of our national lymph-supply.

Three annexed tables (Appendix) show the successive steps of development of our present organization. The first shows the insecure system of 1858, and the small changes which were in that year effected. The second shows the extensive changes of 1859. The third shows the system at present in operation. And I conjoin to them a fourth table, which shows in a compendious form the previous statistics of the establishment.*

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* *See* Appendix, No. V. The information contained in these four tables was communicated to their Lordships by the Board of the National Vaccine Establishment.—J.S.

[**From the Fourth Report, 1861.**]

II. Public Vaccination.

1. *Inspection of Districts.*

[Here follows an account of the District Inspections during 1861. The four summary reports of the inspectors are referred to. They describe the present state of public vaccination in Devonshire, Cornwall, Shropshire, Staffordshire, Essex, Norfolk and Suffolk, and in parts of Derbyshire, Kent, and Somersetshire.—Ed.]

Extensive worthlessness of the present contracts.

Although it would be superfluous for me to give here any abstract of the contents of the inspectors' reports, there is one broad fact made apparent by them, which it seems proper to bring forward for particular consideration :—this fact being, that, in an immense majority of the inspected districts, the existing contracts for vaccination were found to be practically worthless.

The circumstances under which that result has arisen are as follows :—In 1840, when it was first enacted that vaccination at the public cost might be claimed of guardians and overseers throughout this country, and that guardians and overseers, in order to provide such vaccination for applicants, must, under the direction of the Poor Law Commissioners, contract with medical practitioners to be public vaccinators, the Poor Law Commissioners issued an instructional minute, advising boards of guardians as to arrangements for carrying this Act into effect. Points of special importance which, among others, had to be advised on, were these :—to *what number of performers* shall the new duty in any union be allotted? and *how many public attendances* shall each of them be bound to give for the performance of vaccination? The Poor Law Commissioners, in advising on these points, sought of course to give the utmost possible facility to persons desirous of getting gratuitously vaccinated. They wished "to take away "all pretext from individuals for neglecting to avail themselves of the benefit of the contract," and having special regard to this object, they gave advice which led to a very

minute subdivision of public vaccination. They suggested that, as a general principle, guardians should "make the "districts as small, and the number of vaccinators as great as "possible;" that the contractor's residence would often be the most convenient station which could be chosen for a district; that, where this was the case, the contractor should give special weekly attendance at a fixed hour, and should further give his services at any reasonable time, on personal application at his residence; that at other stations the number of attendances should "depend on the population who may be "considered as likely to resort to each station;" and that the contractor should be at liberty, if he thought fit, to vaccinate persons at their homes, and charge for such vaccinations as though they had been performed at his station or residence. Again, 13 years afterwards, when the Compulsory Vaccination Act of 1853 came into force, the then Poor Law Board drew attention to the same points, aud gave advice which tended to a still further subdivision of the public vaccination.

Later experience showed that, in those earliest endeavours to deal with the difficulties of providing a system of public vaccination, one very important consideration had been overlooked. It had been seen that great facilities for vaccination might be given by a large number of stations, and by a large number of surgical attendances:—apparently it had not been seen, or at least had not been insisted on, that multiplication of attendances beyond a certain point defeats the object of attendance, and that public vaccination in a district may often be difficult or inefficient, merely because the stations are too numerous, or the attendances at them too frequent. This consideration, and the consequences resulting from its non-observance, were adverted to in a memorandum, submitted by me to their Lordships in 1859.*

The inspections made during 1861 have brought prominently before their Lordships, as prevailing almost universally in the inspected districts, the evils to which the above passage refers. They almost universally have shown the subdivision

* [See above p. 343.—Ed.]

of public vaccination pushed to an extent in which the object of the contract is defeated. They have shown that, as a rule, the attendances contracted for are such as would make habitual good arm-to-arm vaccination rare or impossible,—that often they are several times as numerous as the births in the same district, so that, even if every born child came to the public vaccinating-station, there would have been many fruitless attendances for each one vaccination performed. They have shown the division of districts to be such that the number of infants requiring to be vaccinated within one contractor's province is scarcely ever more than enough —very often far less than enough—to maintain first-rate continuous vaccination at even a single station, with a single weekly attendance; yet, that the contract subdivides this amount of vaccination among several stations, and often binds the contractor to give at each station an amount of attendance which he must at once discover to be fruitless; that under these circumstances the contractor soon comes to disregard a contract which he cannot carry into effect; and that the vaccination of his district is then carried on under no other law than his individual notions of fitness or personal convenience. Details to this effect abound in each inspector's report, and the general result may be very briefly stated:—among 694 vaccination-districts, with regard to which this matter was inquired into, only 64 were found where the contractor professes to follow regularly the plan of public vaccination prescribed by his contract; in at least 458 of the districts the plans of public vaccination prescribed by contract are confessedly quite disregarded; and in 252 of the districts the local registrar of births, in serving upon parents the statutory notice to have children vaccinated, either does not notify any fixed appointments for public vaccination, or notifies different appointments from those which the guardians have contracted for.

It is scarcely requisite to observe, that this extensive and extreme irregularity of public vaccination is fraught with evil consequences. Contracts which ought to regulate accurately the contractor's movements, and to form the basis for all local advertisements as to the performance of public vaccination,

have come to be regarded (except their stipulations for payment) as of no obligatory force. The local arrangements for vaccination are thus practically withdrawn from all superior control; and though in many cases nothing could be worse than the authorized programme,* yet the unauthorized arrangements are by no means always good. Doubtless this cause has been among the influences which have prevented the successful progress of vaccination in England.

Their Lordships have, therefore, brought the subject under consideration of the Poor Law Board, with whom, and not with their Lordships, rests the approval or disapproval of any proposed contract or vaccination.

[Here follow details as to the work of the department in the inspection of Educational Stations and supervision of the supply of Vaccine Lymph which it is not necessary to reprint.—Ed.]

[From the Fifth Report, 1862.]

I. Public Vaccination.

1. *Inspections.*

[Here follow details of inspections which it is not necessary to reprint.—Ed.]

State of Public Vaccination.
Inspection of school children.

In the statutes which during the last 23 years have been enacted with a view to the extermination of small-pox in this country, the immediate intentions of the Legislature have been as follows:—

first,—that thoroughly good vaccination, provided at the public expense under proper and well-notified arrangements, should everywhere and gratis be within reach of persons who may choose to avail themselves of it;

second—but of course subject to the above,—that it should be obligatory on parents to have their children vaccinated,

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* In one case which came under my notice, the contractor had engaged for habitual attendance *at identical times in three different parishes* of his district.—J.S.

health permitting, within three calendar months from birth,—not necessarily by the public vaccinator, but, if not by him, then by some other medical practitioner whom the parent may select (and then must himself pay) for the purpose;

third—as machinery for enforcing this obligation,—that the fulfilment or non-fulfilment of the obligation should be ascertainable by reference to local registers kept by the respective registrars of births and deaths,—whom also the law requires to notify to parents the obligation which it has imposed on them; that penalties for non-fulfilment of the obligation should be recoverable by summary proceedings from parents who, after notice, are in default; and that especially boards of guardians in their respective unions and parishes should systematically cause such proceedings to be taken.

With regard to the non-accomplishment of these intentions of the Legislature,—it is true that, owing to the utter and universal failure of the intended register of vaccination, the failure of the other parts of the system cannot be quite accurately measured. But, again and again, the inspectors have come upon cases where, quite apart from the register, there was conclusive evidence of extreme local neglect of vaccination. Among the elementary schools which they visited, schools were numerous where the unvaccinated proportion of scholars was from 20 to 30 per cent. of the whole; in more than a few cases it was from 30 to 40 per cent.; in some it was from 40 to 50 per cent.; and in one case (that of Penn in Buckinghamshire) was as high as 55½ per cent. So again among the young inmates of workhouses, though under the very eye of boards of guardians, the inspectors found similar evidence that vaccination was not duly performed;—for among 38 workhouses which Dr. Seaton inspected, there were 8 where the unvaccinated proportion of children ranged from 20 to 38 per cent.;—and among 74 workhouses which Dr. Stevens inspected, there were 20 where the unvaccinated proportion of children was from 20 to 34 per cent. The less exact evidence furnished by the registers of vaccination justifies a conviction that in many cases the local neglect is greater, even very considerably greater, than those discreditable figures

would suggest:—for there are whole unions where there is no reason to suppose that any important number of vaccinations is performed by private practitioners, and where yet the number of vaccinations performed by the public vaccinators does not equal a third of the number of births,—unions, even, where the public vaccinators' vaccinations are as few as 19, 18, 17, 12, and 7 per cent. in proportion to each hundred of births;—and there are instances of districts remaining for long periods, even in one instance, as long as three years, without a single public vaccination being performed.

Evidently, then, the fundamental object of the Legislature—the object of ensuring that every infant (its health permitting) shall be vaccinated within the first few months of life, is very imperfectly attained. And the machinery which the Legislature established for the purpose of enforcing the fulfilment of that object is evidently not operative for its purpose. In explanation of which fact, there are three reasons to be stated;—first, that boards of guardians, except when influenced either by panic of small-pox or by formal remonstrances on the subject, have very rarely done all that they might do, and in many cases have done nothing, to set the machinery in motion;—secondly, that the machinery itself is so imperfect that, even when used with good will, it must be insusceptible of exact working;—and thirdly, that the compulsive provisions of the law (perhaps leniently intended by the Legislature to be ambiguous and feeble, rather than clear and stringent) have in different places been subject to different magisterial interpretations, and have in all places been found insufficient for thoroughly accomplishing their supposed object.

It remains, however, to be observed that imperfect stringency for compulsive purposes is not the only, nor in my opinion the principal, defect of the present law.* The condition which assuredly the Legislature intended to be a condition precedent to any enforceability of vaccination,—the

* It appears, indeed, that the combined efforts of the registrar and public vaccinator, or even extreme diligence of the latter officer alone, may to a great extent, so far as numerical results are concerned, compensate for the insufficient compulsiveness of the law. And if uniformly throughout the country registrars

condition "that thoroughly good vaccination provided at the " public expense under proper and well-notified arrangements " should everywhere and gratis be within reach of persons " who may choose to avail themselves of it," is hitherto very imperfectly realized. Both with regard to existing local arrangements for gratuitous vaccination, and with regard to the required notification of such arrangements, the public has at present ample reason to complain that the conditions are not fulfilled under which alone a system of compulsory vaccination can be tolerable. Partly through the continuance of faults to which I adverted in my second annual report, as faults which their Lordships' regulations of December 1859 were intended to correct, but still more (as described in my last annual report) through the general ill-devisedness and futility of those contracts which pretend to regulate the duties of vaccinators, it results,—not only that to a very great extent vaccination is given in a most impunctual and irregular way,* often without proper local notification,†—but moreover, that

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and public vaccinators had adequate inducements to co-operate, or even if public vaccinators had adequate inducements to give extreme diligence to duties not legally incumbent on them, the local vaccinations might not be in defect. But such inducements are absent.—J.S.

* This result, amply demonstrated by the inspections of former years, was again, in 1862, a matter of constant observation. Of 150 districts in which Dr. Sanderson inquired, there were only 108 where even the existence of contracts was a certainty, and in 70 of these 108 the contracts were entirely disregarded. *See* also Dr. Seaton's report, p. 52;—Dr. Stevens's, p. 73;—Dr. Buchanan's, p. 110. (Appendix.)—J.S.

† Dr. Buchanan reports that, among the 15 unions which he inspected, "in " two unions only were the existing arrangements for public vaccination properly " advertised." *See* also Dr. Seaton, p. 54, and Dr. Stevens, p. 75. (Appendix.) But the greatest defect in respect of notification is the fact that, under the present system of inoperative contracts, the registrars commonly find themselves without proper means of notifying to parents what are the times and places for public vaccination. For instance, the following is Dr. Sanderson's finding in the 79 registration-districts of the 28 unions which he inspected;—in 32 districts the registrar omitted to notify the times of the public vaccinators' attendances; in 26 districts he notified attendances which the public vaccinators did not give; in 6 districts he correctly notified the attendances given, but they were not the attendances prescribed by the respective vaccinator's contract; only in 6 districts did he notify according to fact attendances which were according to contract. *See* also, in this respect, Dr. Seaton's report, p. 54;—Dr. Stevens's, p. 75;—and Dr. Buchanan's, p. 111. (Appendix.)—J.S.

thoroughly good gratuitous vaccination is by no means uniformly given by those authorities whom the Legislature has made responsible for giving it.* And under these circumstances it would manifestly be unjust to punish, for non-compliance with the law, parents whose children are not vaccinated.

I have therefore had no alternative but to submit, for their Lordships' consideration, that the laws now in force for the purpose of extirpating small-pox are not likely to accomplish their object, and that the system established by law for the provision of public vaccination works in an unsatisfactory manner.

2. *Supply of Vaccine Lymph.*

Particulars as to the supply and distribution of vaccine lymph during the year 1862, and means for comparing their Lordships' recent proceedings in this respect with the proceedings of previous years, are given in several appended tables. Appendix No. II.

Supply of Vaccine Lymph to the National Establishment.

Besides seeing to the merely quantitative supply of lymph, their Lordships, during 1862, took special means to satisfy themselves that the lymph which was being supplied under their auspices was lymph of undiminished efficiency. For this purpose, under their Lordships' orders, I requested Mr. Robert Ceely of Aylesbury to inspect all the sources whence lymph is contributed to the National Vaccine Establishment. Mr. Ceely's inspection did not lead him to recommend any change of the present sources of supply. On the contrary, in those stations which (as being most frequented) gave him the

* Very important evidence on this subject is again given in the reports of the present year. Among 127 districts for which Dr. Sanderson reports on the quality of vaccination (as evidenced by the scars observed on the arms of school children examined by him in each district) there were 21 where the proportion of vaccinated children judged by him to have been badly vaccinated ranged from 30 to 62 per cent.;—and there were only 30 districts where, in his judgment, more than half the vaccinated children had got good protection against small-pox. *See* also Dr. Seaton's report, p. 47;—Dr. Stevens's, p. 66;—and Dr. Buchanan's, p. 113. Some important facts as to the relation which the quality of local vaccination bears to the local vaccinator's method of operating are given by Dr. Seaton at p. 48, Dr. Sanderson at pp. 99–106, and Dr. Buchanan at page 115. (Appendix.)—J.S.

best opportunities of forming conclusions on the subject, he "met with abundant evidence of the perfectly satisfactory "character of the lymph there in use." In reporting this judgment of Mr. Ceely's, I cannot over-state the importance which I attach to it. For to Mr. Ceely, more than to any man since Jenner, the medical profession of this country is indebted for its knowledge of the natural history of vaccination. And in my opinion there is no living person on whose testimony the public could more entirely rely as to the quality of the lymph which their Lordships are responsible for distributing.

[Here follow details of inspections of the sources of lymph-supply which it is unnecessary to reprint.—Ed.]

[From the Sixth Report, 1863.]

I. Public Vaccination.

1. *District Inspections.*

[Here follow details of inspections which it is not necessary to reprint.—Ed.]

On several former occasions I have written so fully on the very unsatisfactory working of our system of public vaccination, that now (since I have nothing but the same story to tell) I need only refer to the abundant further evidence which the appended reports contain in condemnation of that system and of its working.* But while thus omitting to dwell in detail upon evils which I have already exposed, I would advert, though very briefly, to the result which those evils are producing. Small-pox, instead of being virtually extirpated from among us, is continuing to be a considerably fatal disease. Small-pox, which for eight consecutive years

* *See*, for instance, of different kinds, in Dr. Seaton's report, the cases of Cardiff, Ross, York, Scarborough, and Hull,—in Dr. Stevens's report the extreme cases shown in his Table D., and in some others of his tables,—in Dr. Sanderson's report, the cases of Axbridge Union, and of the districts of Uley, Swymbridge, Winkleigh, Bideford, Tetbury, and St. Decuman's,—and, as one ample illustration, the account which Drs. Seaton and Buchanan give of the vaccination of London. (Appendix.)—J.S.

Small-pox mortality in different registration districts in England.

in the Grand Duchy of Baden, and for 13 consecutive years in the city of Copenhagen, took away not one single life, killed last year in London 2,000 persons. In other parts of England it has been and is constantly proving largely fatal. And probably five-sixths of its victims are children under 10 years of age; who, at least since 1853, under the vaccination law of that year, ought to be effectively vaccinated before they are four months old; but of whom, if they had been thus vaccinated, probably not one would have died of small-pox. There are indeed considerable parts of the country where this scandalous state of things does not

	Annual Death-rates by Small-pox, per 100,000 living under 5 Years of Age, in the different Registration Districts of England.
In 44 Registration Districts - - -	—
„ 297 „ - - - -	1 to 50
„ 131 „ - - -	51 to 100
„ 75 „ - - - -	101 to 150
„ 39 „ - - - -	151 to 200
„ 24 „ - - - -	201 to 250
„ 8 „ - - - -	251 to 300
„ 5 „ - - - -	301 to 350
„ Shrewsbury - - - -	382
„ Northampton - - - -	456
„ Plymouth - - - - -	463
„ Merthyr Tydfil - - - -	572

N.B.—In 72 of the Registration Districts of England the death-rate from all causes of children under 5 years of age is under 4,000, and in 12 of these is under 3,350.

prevail; and in order to illustrate how wide a range of difference there is in this respect between different jurisdictional areas in England, I will quote some figures from the very important statistical return which has recently, on Mr. Lowe's motion, been laid before Parliament.* The return contains (with other things) a statement of the respective proportions in which death by small-pox occurred during the

* Return of the average annual Proportion of Deaths from specified Causes at specified Ages, in England generally, and in each Registration Division and Registration District of England, during the decennial period 1851-60;—Ordered by the House of Commons to be printed, 5th February 1864:—Sessional Paper,

10 years 1851–60 in the 627 different registration districts of England among children under five years of age. The annexed table gives an abstract of that statement. It shows that in 44 of the 627 districts not even a single child had died of small-pox. But, for the remaining 583 districts, it shows results which gradually rise into the evidence of enormous neglect. Indeed, as we descend the column, we find that at last the local death-rates by small-pox represent considerable proportions of what in healthy districts would be the death-rates from all causes,—becoming, for instance, in Shrewsbury more than a ninth part, in Northampton and Plymouth about an eighth part, and in Merthyr Tydfil not less than a sixth part of such a normal death-rate from all causes.

With reference to the 2,000 deaths which there were last year in London from small-pox, I would very particularly refer to the report which Drs. Seaton and Buchanan give of the state of the public vaccination, and to the suggestions which they make for a fundamental change of the present system.

2. *Supply of Vaccine Lymph.*

[Here follow details of the work of the department which it is not necessary to reprint.—Ed.]

Cowpox in Gloucestershire and Somersetshire.

In connexion with this subject, I advert with interest to some information which Dr. Sanderson, while inspecting the vaccination districts of Gloucestershire and Somersetshire, received from local medical practitioners with respect to the present occasional prevalence of natural cowpox in parts of these counties. He is informed, namely, that that infection is still common in the dairy farms of the Bridgewater level and of the vale of Gloucester,—*i.e.*, in the whole of the level country round Bridgewater bay, between the coast and the Mendip and Qwantock hills, and in the whole pastoral country which, from Gloucester to Thornbury, lies between the Severn and the Cotswold hills, having Berkeley (Jenner's

No. 12; and its continuation, No. 12–I., ordered to be printed 4th March 1864. [More particular reference to these important returns, prepared in the General Register Office, will be found below. See last section of Fourth Annual Report.—Ed.]

birthplace) in its centre. Dr. Sanderson informs me on the subject as follows:—"From statements made to me by "practitioners in these districts, it appears that cowpox is "usually to be met with in the dairy farms in the months "of April, May, and June. When a dairy is invaded, the "disease not only infects the whole of the stock, but is "very frequently communicated to the milkers—invariably "men; on whom the vesicles are seen on those parts of the "hand which are applied to the teat in the act of milking, "particularly on the grasping surfaces of the thumb and "index finger. The inoculating of lymph directly from the "cow has been practised in several districts with success. "All who have employed such lymph agree in stating that "after the first or second transmission the results obtained "do not differ from those of ordinary vaccination, either in "respect of the progress or character of the vesicle." At the end of Dr. Sanderson's account of his vaccination-inspections will be found his detailed memorandum of the information which he received on the subject.

3. *Educational Vaccinating Stations.*

[Here follow details of inspections which it is not necessary to reprint.—Ed.]

[The **Seventh Report, 1864,** contains an account of local proceedings for public Vaccination which it is not necessary to reprint.—Ed.]

[From the Eighth Report, 1865.]

I. Vaccination.

[The portions relating to district inspections and ordinary supply of lymph are omitted from the reprint.—Ed.]

Supply of Vaccine Lymph.

There were cases where lymph was desired for the purpose of vaccinating horned cattle. Some crude speculations which had been published as to the nature of the prevailing cattle-plague, with still cruder half-promises that vaccination would prove protective against the disease, had, very naturally,

filled the cattle-owners of the country with eagerness to provide the suggested security for their herds; and for while (beginning towards the end of December) the demand for vaccine lymph was insatiable. As this demand, with the public hopes which created it, continued till after the end of 1865, and indeed did not reach its maximum till about the middle of January in the present year, I perhaps ought not, strictly speaking, to say more of it in this report. But as it would be useless to refer again next year to the subject, I may say that during the early part of January the applications for lymph (among which it was not generally possible to discriminate the applications of cattle-vaccinators) were so numerous as to endanger the solvency of the establishment. In the previous ten years, including periods when human small-pox had been most widely epidemic, the average number of applications in the month of January had been 932, and the highest number had not reached 1,500. But in this January the applications exceeded 3,000; among which only 279 could be discriminated as for veterinary purposes; and on the 18th of the month, when this great demand culminated, the total of the one day's applications were as high as 178. Of course, whenever I learnt from the terms of an application that to vaccinate cattle was the object for which the lymph was wanted, my duty was to consider the applicant's claim as subordinate to that of persons who wanted lymph for human vaccination; and, as the lymph-supply at my disposal was not more than enough to provide for the latter purpose, I felt obliged to refuse lymph to the 279 applicants whom I could discriminate as cattle-vaccinators. There must, however, have been many other hundreds of cases where also the applicant's object was to vaccinate cattle, but where this object, being undeclared in his application, could not be discriminated and made a ground for refusal. Under these circumstances there was great reason to fear that the innumerable inconclusive trials which amateurs were making in all parts of the country as to the value of cattle-vaccination, and the consequent enormous waste of vaccine lymph, would cause such an

Application of cattle vaccinators for lymph.

exhaustion of the national lymph-supplies as must seriously derange human vaccination throughout the United Kingdom. Fortunately, the truth as to the uselessness of the proposed cattle-vaccination became known before that great mischief was produced; and the demand for lymph subsided as rapidly as it had risen. It may be proper for me to add, that, if the scientific observations which were being made under the auspices of the Cattle Commissioners, and otherwise, had justified an opinion that the vaccination of cattle ought to be recommended, special arrangements would have been neccessary to supply lymph for that purpose; and that, had the case arisen, I should have submitted to the Lords of the Council suggestions which I had in readiness for such arrangements.

In 1865, as in preceding years, my Lords took special means to satisfy themselves as to the undiminished efficiency of the lymph which is supplied under their direction. Dr. Seaton visited all the stations whence the public lymph-supply is derived, and reported quite satisfactorily of the quality of the lymph which was in use. The list of stations supplying lymph was increased by the addition of one of the parochial stations at Salford. And lymph has also been supplied from an important vaccinating-station at Glasgow.

[Here follow details as to Educational Stations which it is unnecessary to reprint.—Ed.]

[From the Ninth Report, 1866.]

GRANTS FOR PUBLIC VACCINATORS.

System of gratuities to public vaccinators.

1. As regards the grant for public vaccinators, Parliament in 1866 commenced experimentally the course of subsidising public vaccination, by empowering the Lords of the Council to distribute among meritorious public vaccinators, on the principle commonly called that of "payment for results," a grant of money voted for this purpose.

The intention of this grant was not to relieve local rates of a part of the costs already chargeable on them for fees to public vaccinators, but to provide, independently of local

rates, that meritorious public vaccinators should have their earnings by vaccination increased. There had always been a great deal of complaint from the medical profession that public vaccination was not sufficiently paid for. Against this complaint it was argued that guardians had no better means of determining what price to pay for public vaccination than by adopting the minimum price for which duly qualified local practitioners were willing to contract to furnish it; and that, a certain market price for vaccination being thus fixable, practitioners could not reasonably complain of terms which they had voluntarily accepted, nor guardians properly be coerced by legislation into paying an artificial, protective, price for the service. And of course on all sides it would be recognized that, however poor might be the remuneration under contract, the practitioner who had voluntarily made the contract could not plead the poorness of payment as an excuse for imperfectly fulfilling his engagements. Yet, on consideration of the whole case, Parliament, in 1853, had determined that the price to be paid for public vaccination could not, with due regard to national interests, be left an entirely open question between guardians of the poor, on the one hand, and competing members of the medical profession on the other. It had fixed a minimum price of 1*s.* 6*d.* (with additional rate for distance) below which it should not be lawful for guardians to pay. But the fixing of this minimum (which in practice guardians were very apt to regard also as their maximum) did not satisfy the medical profession; and always, when consideration was being given to proposals for amending the vaccination laws, question arose whether the provisions of 1853 as to payments for public vaccination could be so changed as to remove that dissatisfaction. It was found, however, that any statutory fixing of a higher minimum rate for vaccination contracts would be strongly resisted on the part of local authorities; and apart from this kind of opposition, doubts were entertained as to the propriety of pressing any further a principle of legislation so evidently exceptional as one which aimed at protecting the medical profession from the ordinary conse-

quences of competition among its own members. On the other hand no sensible person could avoid seeing that the national defences against small-pox might be of a most untrustworthy sort, if the business of seeing to them for each locality were virtually assigned by the guardians to the lowest professional bidder. The mischief of such a system would not lie so much in those extreme cases (which I trust would be as rare as they would be scandalous) where a contractor, poorly paid for prescribed duties, might deem himself free to neglect them: it would consist far more in the very extensive unwillingness, which would be engendered, to incur trouble beyond the letter of the contract. And this kind of feeling, as I endeavoured ten years ago to express, would, in my opinion, be the worst of dangers to public vaccination.* The national utility of public vaccination depends, to a degree which unskilled persons can hardly imagine, on the condition that its local administrators shall work, not merely as competent perfunctory performers of prescribed tasks, but thoroughly with zeal for their work. And in this point of view it becomes an important public object that the scale of payment provided for their service shall be such as they can accept with satisfaction.

My Lords, after considering all the circumstances of the case, determined that the best course for them to take was to ask authority from Parliament to give to public vaccinators, under certain regulations, gratuities in excess of their contract receipts. The contract rate might, they thought, remain as heretofore, to be adjusted between guardians and medical practitioners, subject only to the actual statutory provision of a minimum; and they would assume (as indeed no other assumption is practicable) that the contract rate represents a payment which the contracting medical practitioner deems sufficient for his prescribed duties: but, inasmuch as the thoroughly well-vaccinated state of the population of a place indicates, almost of necessity, that the contractor exerts himself in various ways which lie beyond the definite obligations of his contract—exerts himself with zeal both to optimise the

* Vide History and Practice of Vaccination, p. 294.—J.S.

quality, and also to maximise the quantity, of the local vaccination, therefore my Lords would ask Parliament to allow an annual sum out of which extra remuneration for this zealous work might be awarded under their Lordships' direction.

In the Vaccination Bill of last session, as amended by the Select Committee of the House of Commons to which it was referred, there was a clause which purposed to make permanent provision in the above sense. Its terms were these:—"On reports made to the Lords of Her Majesty's "Council with regard to the number and quality of the "vaccinations performed in the several vaccination districts "of England, or any of them, the said Lords may, from time "to time, out of monies provided by Parliament, and under "regulations to be approved by the Lords Commissioners of "Her Majesty's Treasury, authorize to be paid to any public "vaccinators, in addition to the payments received by them "from guardians or overseers, gratuities, not exceeding in "any case the rate of one shilling for each child whom the "vaccinator has successfully vaccinated during the time to "which the award of the said Lords of the Council relates." The Vaccination Bill of the Select Committee could not last year become law; but before the end of the session Parliament provisionally accepted the principle of that clause, and voted a sum of 5,000*l.* to enable my Lords to carry it into effect during the remainder of the financial year.* The launching of the new scheme was necessarily delayed for some weeks by the pressure on the office of work arising out of the prevalence of cholera in England; and it is only since the end of 1866 that the intended rate of reporting for the administration of the grant has been reached. For the purposes of the inspection of public vaccination (including the purpose of administering this grant) the whole of England and Wales has been divided into four districts, each with its inspector. Two of the inspectors began from October 1st to

* While this report has been printing, the Vaccination Bill of last year has again been before Parliament, has passed both Houses without any substantial change, and (with the above-quoted provision in it) is at present awaiting the Royal assent.—Aug. 3, 1867.—J.S.

make their recommendations as to gratuities; and a third from December 1st; but the fourth only from the first day of the present year. It is anticipated that each inspector will be able to complete the inspection of the public vaccination of his district once in every two years; and as he makes the successive steps of this inspection in the several unions or parishes of his district, he reports in succession as to the vaccinators. The adjudications of the Privy Council on these reports are monthly; and from the above-described distribution of work, each award, as a rule, will be biennial for the district to which it relates. Grants are recommended to public vaccinators whose work has been good both in quality and in quantity; and provisionally, two grades of rewardable merit have been recognised,—one to receive the whole, the other to receive two-thirds, of the sum permitted by Parliament.

On the present occasion, of course, I have only to speak of the above scheme as put in action by the Lords of the Council. On future occasions I may hope to speak of its working. And even now I will venture to express a very sanguine hope and belief that it will be found very importantly conducive to the objects for which Parliament has established it.

[The **Tenth Report, 1867,** contains the usual account of the departmental proceedings with reference to Vaccination which it is not necessary to reprint.—Ed.]

[From the Eleventh Report, 1868.]

I. Vaccination.

1.—*District Arrangements.*

New Vaccination Law.

The superintendence of Public Vaccination in England occupied during the whole of the year 1868 a more than ordinary share of the attention of the Lords of the Council. For on the first day of the year the new Vaccination Act, 30 & 31 Vict. c. 84, came into operation; and, from then

onwards, my Lords were constantly engaged in proceedings, such as the Legislature intended to be taken, for the improvement of our public vaccination in respects where the system had hitherto been at fault.

New regulations affecting contracts.

The nature of the defects which required correction had been very fully explained in successive annual reports of this department, particularly in those from the second to the sixth inclusive; and as far back as 1859 my Lords had communicated to the Poor Law Board, for the assistance of local authorities contracting for public vaccination, an exposition of the broad principles of arrangement on which contracts must in future be based if the defects in question were to be prevented. In 1868, with the new law, the time had come when this merely recommendatory mode of dealing with very serious evils could no longer be considered sufficient; and my Lords accordingly saw fit to issue express regulations for the purpose, by an Order of Council bearing date February 18th, 1868. Of the regulations thus issued, a copy is subjoined to this Report, as Appendix No. 2. The great object was that public vaccination should no longer be so excessively subdivided among times and places and persons as to have needless difficulties put in the way of its effective performance; and with this object the regulations provided, as their general effect, that the public vaccinator under ordinary circumstances should vaccinate only at public stations, and at no station oftener than once a week, and, if in a town district, only at one station therein; that no two public vaccinators should in any case act for one and the same district; and that the division of towns into vaccination districts should not go beyond certain limits of smallness. Also, with reference to section eight of the new Act, a special regulation was made, limiting the extent to which re-vaccination at the public expense might be given.

New contracts.

The new law did not abrogate any of the existing contracts for public vaccination, but it tended to make new contracts in many cases desirable; and thus during the year new arrangements, which had to be conformed to the new law and to the regulations operating under it, and which my Lords had to

consider in more or less detail, and for the most part very minutely, with the respective local authorities or with the Poor Law Board, were proposed by more than a seventh part of the entire number of vaccination authorities of the country. The year has in this way been one of very great improvement in our system of public vaccination. Also in other and ordinary ways influences for improvement have been at work.

Ordinary inspections, and awards to vaccinators.

The systematic inspection which goes on under their Lordships' orders extended during the year to nearly half the public vaccination of England, namely, to 1,749 vaccination districts, comprised in 312 different unions or parishes: each inspection involving, first, an inquiry into the state of vaccination in the district; secondly, where requisite, a notification to the authority of defects found in the local arrangements for carrying the law into effect, and advice as to the changes required; and thirdly, in suitable cases, a recommendation of the vaccinator for reward under section five of the Vaccination Act, and in accordance with the system described in my ninth report. Of the money which Parliament had placed at their Lordships' disposal for this purpose my Lords distributed 2,753*l.* 2*s.* The number of vaccinators to whom gratuities were given was 345; namely, 129 who received first-class, and 216 who received second-class, gratuities. The gratuities of each class differed of course very considerably in money value in different vaccination-districts, just as the several contract-earnings differed. Where a public vaccinator was having so few vaccinations as to be only earning from his board of guardians some 20*s.* or 30*s.* a year, the supplementary payment by the Privy Council was necessarily quite insignificant as money, and, except that it implied an honorable recognition of service, might scarcely have seemed worth the trouble of formal transmission and acknowledgment; but, on the other hand, in many cases the payments were such as probably to be in themselves welcome additions to the often scanty stipends of the recipients. The largest aggregate payment of the year (a first-class gratuity on 2,738 vaccinations) was 136*l.* 18*s.*; the smallest (a first-class gratuity on 19 vaccinations) was only 19*s.*

2.—*Supply of Vaccine Lymph.*

Supply of vaccine lymph.

My Lords, as usual, took means during the year to satisfy themselves as to the undiminished efficiency of the lymph which is supplied under their direcions.

Animal vaccination.

With reference to this branch of the service, my Lords had their attention drawn to a system which is in vogue in some parts of the continent, for maintaining continuous sources of lymph-supply for the human subject by keeping a succession of calves inoculated with the specific contagium; and their Lordships had a report prepared for them by Dr. Ballard on the arrangements which are in use abroad for this so-called "animal vaccination." Further information, however, is requisite before any final opinion can be formed on the question of making more or less use of the system for purposes of our National Vaccine Establishment; and therefore on the present occasion the subject cannot be written of in detail.

Educational status.

Fourteen of the twenty-two stations which are sources of lymph-supply for the National Vaccine Establishment, and also two stations which do not supply lymph for the public service, are used as educational stations under their Lordships' Order of December 1st, 1859. My Lords during the year inquired as usual into the conduct of the educational business of these stations, and received on this subject, as on the subject of the lymph-supply, a report which was entirely satisfactory.

Appendix No. 2 to Eleventh Report.

Appendix No. 2.

Further Vaccination Regulations.

No. 2.—Further Regulations by the Lords of the Council for securing the efficient performance of Public Vaccination, and in respect of the Re-Vaccination of persons who apply to be re-vaccinated, made and issued February 18th, 1868.

I.—*Places and Times for Vaccination under Contract.*

1. Except where the Privy Council, for reasons brought to its notice, sees fit in regard of any particular district to sanction a system of domiciliary vaccination, every vaccination-district shall have in it at least one public station appointed for the performance of the vaccinations under contract; and where any such station has been provided for a district, no person resident within two miles thereof, and not being an inmate of the workhouse, shall be vaccinated under contract elsewhere than at such station, unless the vaccinator in the particular case be of opinion (which, if so, he is hereby required to note in his register) that, for some special reason, the person whom he purposes to vaccinate cannot properly be vaccinated at the station.

2. Except under special authorization from the Privy Council as aforesaid, or in so far as may be expedient at times when there is immediate danger of small-pox, vaccination under contract shall not be appointed to be performed at any station oftener than once a week.

3. And in any future contract concerning a vaccination district which is partly or wholly within a town, there shall not, except under special authorization as aforesaid, be appointed within the town more than a single station for the performance of the vaccinations of the district.

II.—*Vaccination Districts in Towns.*

No part of the metropolis, or of any city, or municipal borough, or town corporate, or other town, shall, in respect of any future contract, form by itself, or with any rural place, a separate district for vaccination, except with the approval of the Privy Council, unless it contain an estimated population of at least 25,000 persons, or else be as much of the metropolis, city, borough, or town, as is for purposes of vaccination under the control of one board of guardians.

III.—*Office of Public Vaccinator.*

After the expiration of the month of June next, no two or more persons shall be allowed to act severally as vaccinators under contract in any one and the same part or district of any union or parish.

IV.—*Re-Vaccination.*

The performance of re-vaccination by the public vaccinator on persons applying to him for that purpose shall be limited in each case by the following conditions: (1) that, so far as the public vaccinator can ascertain, the applicant has attained the age of 15 years, or, if during any immediate danger of small-pox, the age of 12 years, and has not before been successfully re-vaccinated; and (2) that, in the public vaccinator's judgment, the proposed re-vaccination is not for any sufficient medical reason undesirable; and (3) that the public vaccinator can afford vaccine lymph for the purpose without in any degree postponing the claims which are made on him for the performance of primary vaccination in his district.

[From the Twelfth Report, 1869.]

III. Public Vaccination.

In 1869, as in previous years, my Lords superintended the Public Vaccination of England.

[Here follow details of inspections which it is unnecessary to reprint.—Ed.]

Animal vaccination as a source of lymph supply.

4. In my last year's report, when referring to our National Vaccine Establishment, I stated that the attention of my Lords had been drawn to a system which is now in vogue in some parts of the continent of Europe, for maintaining continuous sources of lymph-supply for the human subject by keeping a succession of calves inoculated with the specific contagium; and that their Lordships had had a report

prepared for them by Dr. Ballard on the arrangements which are in use abroad for this so-called "*animal vaccination;*" but that further information was necessary before any final opinion could be formed on the question of making more or less use of the system for the purposes of our National Vaccine Establishment. I have now to state that during the year 1869, in order to procure such further information, Dr. Seaton was instructed to visit certain foreign towns where animal vaccination is practised, and to collect evidence as to the working of that system. And I subjoin (App. No. 7) the report which Dr. Seaton has made on the matter thus given him for inquiry.

Facts stated in Dr. Seaton's report show most clearly that the system, as at present understood, has certain great disadvantages; and these, in my opinion, are of such kind as at present entirely to forbid an adoption of the system in place of our own, unless on independent grounds our own already deserved to be condemned. The disadvantages, at present imputable to animal vaccination, are its various peculiar liabilities to failure:—first, that apparently even able and painstaking operators may find it impossible to transmit successive vaccination from calf to calf without very frequent recurrence of failures and interruptions; secondly, that the transference of infection from the calf to the human subject even under the most favourable circumstances (*i.e.* by experienced operators and with lancet direct from calf to arm) has in it such risks of failure, that, for instance, at Rotterdam, the proportion of unsuccess was nearly twenty times as great as in the ordinary arm-to-arm vaccinations; and thirdly, that the calf-lymph, as compared with ordinary lymph, is peculiarly apt to spoil with keeping, and in the form of tube-preserved lymph can so little be relied on, that the Rotterdam establishment in distributing supplies of lymph now uses only lymph from the human subject. Evidently, then, in the present state of knowledge, a system of animal vaccination would have in it an extreme uncertainty of operation; and this uncertainty would, for obvious reasons, be so conclusive against our preferring the system on its own merits for

purposes of public vaccination, that practically we have only to consider whether our own system has demerits entitling it to any considerable mistrust.

To the question whether any such mistrust ought to be entertained, I have already in part given a satisfactory answer in reporting the undiminished efficiency of the lymph which is supplied by our National Vaccine Establishment; but the question includes another point, on which at the present opportunity I would wish to submit a few more explicit observations.

Alleged invaccinations of syphilis.

§. The advocates of animal vaccination in this country have very generally taken as their chief ground, that our ordinary system of vaccinating from child to child involves the risk of spreading syphilis in the community: *i.e.* (as I understand the proposition) by means of a compound contagium which the child with inherited syphilis, but perhaps with no outward signs of this taint, may supply from its vaccine vesicles. And I will at once concede that if this risk were real in the sense which is apparently meant,—if, namely, a vaccinator, though using the ordinary lights of professional knowledge, and operating according to the rules of his art for the time being, must nevertheless under our present system be liable to spread syphilis among those whom he vaccinates,—such liability would represent a very strong argument in favour of some change of system. This hypothetical concession, however, must not be taken for more than it means. Very advisedly it does not go beyond the case of *vaccination properly performed:* for this is what the State understands by "vaccination," when requiring it to be universally adopted, and when offering it gratuitously to all applicants; and the vague possibilities of *mala praxis*, though they require incidental consideration, are almost irrelevant to our main issue.

In any attempt to discuss the subject of alleged invaccinations of syphilis, it is essential to remember that such allegations may easily be made, with or without dishonest intention, in cases where there is not even a pretext for them; and that above all, where such allegations relate to single

infections of syphilis, hasty belief in them ought particularly to be avoided. A first reason for caution is this :—" When a " child is born with the heritage of syphilis (a very frequent " incident, if its parents have been suffering from that infection) " the characteristic symptoms commonly do not appear till " some weeks after birth, and then the scandal discloses " itself. Now among persons with any sense of shame, the " knowledge that one had transmitted syphilis to one's " child would always be a sore subject. There would be " strong temptations to employ false pretexts. Not only " would parents often conjointly wish to disguise from their " medical attendant, or from members of their household, " the real explanation of the child's ailment ; but also, not " infrequently, one parent would wish to conceal from the " other that the origin of the disease had been a conjugal " infidelity. In respect even of unmarried people, every " surgeon knows what utterly false, far-fetched, and absurd " explanations are given of syphilitic symptoms, primary and " secondary ; and it requires little experience to imagine how " much more pertinacious will be the demand for excuses, " and how much more active the supply of falsehood, under " the complicated circumstances of connubial syphilis. Ac- " cordingly it is a matter for surprise that vaccination has " not almost generally been pitched upon by persons in search " of an apology for their syphilitic children." Another reason for caution, even in cases where the good faith of the accuser is unquestionable, consists in the fact (for which I can vouch from personal observation) that a simple surgical cut, in a child having latent in it the taint of hereditary syphilis, may proceed by ulceration to assume the ordinary characters, and require the specific treatment, of a syphilitic sore. For, as such is the fact, presumably the same thing might happen at the vaccination-punctures of a child having latent constitutional syphilis ; so that, under the operation of the constitutional taint, they, or one of them, though the vaccination had been performed with perfectly healthy lymph, would become the seat of syphilitic ulceration ; a phenomenon, which, if the parents were disguising the previous facts of the case,

might mislead or greatly perplex an observer. Moreover, if there are cases where these sources of fallacy do not apply, cases where a person pretending to vaccinate has indubitably inoculated syphilis, we must not, without very critical examination, assume that the act which did the mischief was one which could in any reasonable sense be called vaccination, or that any inference from such a case is applicable to our present argument. For in foreign countries attempts have again and again been made to decide by experiment whether vaccination from persons obviously ill with constitutional syphilis will communicate syphilis to the recipient; and it is, to say the least, a very remarkable fact that in not one of these experiments has anything like syphilis resulted.* On a former occasion (of which I shall presently have again to speak) I quoted many such experiments; how, for instance, M. Taupin, of the Children's Hospital at Paris, in order to settle such questions as these, had, in large numbers of cases,

* The evidence of these experiments is in so far practically unimportant to us, that subjects such as they describe ought never under any circumstances to be used in contribution to lymph-supply. It is a fundamental rule in vaccination that lymph is to be taken only from subjects who, as far as can be ascertained, are healthy; and, irrespectively of the moot question of physical consequences, a vaccinator must be criminally indifferent to the social acceptance of the great good which he pretends to administer, if ever in any single case, acting in contravention of that rule, he affronts the natural antipathies of those who bring their children to him to be vaccinated. Still, the above quoted experiments are of extreme speculative interest; and I therefore observe that their very curious testimony, as regards syphilis, is confirmed by the equally curious fact that small-pox, under similar conditions, has again and again been seen not to communicate itself by vaccination. For, not once or twice, but at least hundreds of times especially in the early days of vaccination, something to the following effect has occurred :—A patient, after exposure to the infection of small-pox, has been vaccinated a little too late for his protection. Warned of his danger, he has had recourse to vaccination when already small-pox was latent in his system. The two contagia, the inoculated vaccine contagium and the previously inhaled contagium of small-pox, have been simultaneously operative in him; the latter producing the general eruption and high febrile disturbance of small-pox, while the former has produced at the vaccinated spots characteristic Jennerian vesicles. And from the lymph of those Jennerian vesicles, again and again, successful vaccinations on other subjects have been performed: vaccinations pure and simple, without any communication of small-pox, though the patients whose Jennerian vesicles had yielded lymph for these vaccinations had at the time their bodies generally pervaded and drenched with the infection of the other disease.—J.S.

deliberately vaccinated from the arms of children who (while under vaccination) were sick with all other sorts of communicable disease, including syphilis, but had never, on any occasion, seen any of these infections communicated in his vaccinations: "*dans aucun cas, nous y insistons à dessein, "le virus n'a rien communiqué que la vaccine toute seule:*" how, again, Dr. Schreier of Ratisbon had similarly on two occasions experimented with vaccine lymph from very syphilitic children, and, like M. Taupin, had got no syphilitic results: how, also, Professor Heim, of the Wirtemberg military service, had done similar experiments with similarly negative results: how, further, Dr. Heymann had seen, as the habitual practice in Java, that children having scrofula, syphilis, itch, the endemic frambœsia, and other complaints, were used indifferently with others as sources of vaccine lymph, and that no evidence ever appeared of any of the complaints being so communicated. And to this former negative testimony from several independent experimenters I may now add the similar testimony of Professor Boeck of Christiania: testimony which has peculiar value because of Dr. Boeck's very eminent relation to contemporary studies of syphilis. In the British Medical Journal of September 23rd, 1865, Dr. Boeck reports that, having under his observation two men affected with elephantiasis, two men who never had had syphilis, and whom their elephantiasis of course would not have rendered insusceptible of it, he, on three different occasions far apart, vaccinated these two men from children having well-developed hereditary syphilis; that in one of the six vaccinations, five normal vaccine vesicles resulted, but in the others none, nor any other local change; that "these "two patients were observed daily during three years, and "never presented a single symptom of syphilis." * With

* It may be noted in passing, that if Boeck's experiments had conveyed syphilis, their evidence would not have been conclusive against the *lymph* which he used. For, in all six vaccinations, he was careful to use not lymph alone, drawn from the arm of the syphilitic child, but an admixture of lymph and blood drawn from that impure source. And therefore, if syphilis had resulted, the question would still have remained, whether lymph, without blood, would have done the mischief.—J.S.

well-attested experiments like the above standing on record, we are obliged to doubt whether vaccination (*i.e.* genuine and simple inoculation with vaccine lymph) from however syphilitic a subject can possibly communicate syphilis; or, at the very least, whether some stage of the vaccine vesicle more advanced than vaccination rules allow to be proper for lymph-supply, or some admixture, which fastidious vaccinators never permit, of blood with the vaccine lymph, must not be a condition for such possibility. That some ignorant quack-salver, pretending to vaccinate, but neither knowing the aspects of a vaccine vesicle, nor caring from what sort of body he draws his supposed lymph, may take, as his "healthy source "for lymph-supply," an infant all maculated or ulcered with syphilitic skin-disease, and may from its spots or sores transfer infective material to some victim of his miscalled vaccination, is of course evident; for syphilis does not cease to be syphilis because noodle or knave calls it vaccinia; but facts of this kind cannot in any reasonable sense be counted against vaccination, any more than we should count it a fact against quinine that some grocer had dispensed strychnine in mistake for it. Finally, too, I permit myself this general remark: that, in proportion as any alleged fact contradicts an otherwise universal experience, the individual witness must be regarded as making larger and larger demands on us for belief; and that in matters like the present, where sources of fallacy are so abundant, the witness's accuracy of observation requires to be most thoroughly guaranteed.

From this preliminary statement of the very real difficulties of the discussion, I proceed to the alleged case against vaccination.

During the last sixty years the medical literature of Europe has gradually accumulated records of various occasions (I believe, in all, more than twenty) on which it has been definitely imputed to a vaccinator that he had made syphilitic inoculations. From various causes it is impossible to obtain absolutely complete and trustworthy evidence even on the most recent of these cases; and in a large proportion of the number (particularly in those which were of earliest

date, and in those which have related only to single vaccinations) there may have been misstatements or fallacies which cannot now be exposed. Of the 14 accusations which seem to be most credible, 9 were in Italian practice, 2 in German, and 3 in French; or if four of the fourteen be omitted, as relating only to one or at the utmost to two vaccinations, the remaining 10 were in 7 instances Italian, in 2 German, and in 1 French.* As regards most, if not all, of these ten instances, I think it certain that the so-called vaccinator really did, somehow or other, produce the result which was imputed to him. What may have been the intimate mechanism of these occurrences as regards the introduction of the extraneous poison, I cannot feel perfectly sure. It is not to be expected that the man who has introduced syphilis while purporting to vaccinate always will, or even always can, inform us how his effect was produced.† As regards the French case (concerning which I happened at the time to be able personally to get some particulars, but have in vain endeavoured to obtain official records) I was satisfied by such informal statements as were made to me, not only that the mischief had not arisen in any decently-conducted vaccination, but that the circum-

* Three of the most important cases have been within the last twelve years. One, unfortunately on a large scale, was in 1862, at Rivalta, near Acqui, in Piedmont; in connexion with which, report was made of a similar mischief having occurred six years previously at Lupara in the province of Naples; and another such occurrence was at Paris in 1865.—J.S.

† His mere declaration of blamelessness in the matter must generally, from the nature of the case, be in itself almost valueless. Perhaps the chief point respecting which he is on his trial is, whether, in an infant from whom he took lymph some three or four months ago, he *overlooked* signs, which he ought to have seen, of syphilis: and his assertion that he saw no such signs is in itself worth nothing, unless it be sure that his eyes were properly open, and his wits properly educated, to see and understand whatever of the kind may have been there. Or the point raised about the vaccinator, may be whether, some three or four months ago, he *unawares* did some thoughtless or slovenly act which mixed syphilitic and vaccine contagia on his lancet, or substituted the former contagium for the latter; but here again, for obvious reasons, his mere denial might count for little. And while thus from the nature of the question the vaccinator's personal testimony in his own favour must (whether it be true or false) almost necessarily be inconclusive, conclusive collateral testimony, in cases of any real doubt, can of course hardly ever be attainable. J.S.

stances under which it arose were circumstances of the most atrocious misconduct. That misconduct was also at the root of the two German cases may be sufficiently gathered from the fact that in each case legal proceedings were taken against the vaccinator, and resulted in his being sentenced to imprisonment. The remaining seven cases (including the most important cases in the whole list) are all Italian; which fact in itself is noteworthy, as the Italian rules of vaccination-practice appear to be in some respects less strict than our own; and, beyond this, I find that in some of the cases, fault, which even the Italian rules would no doubt call malpractice, is confessed. It was with reference to facts like these that at starting I thought it so necessary to distinguish between *vaccination properly performed* and the *mala praxis* of an individual vaccinator. That, under such circumstances as there were in the French case and manifestly in some of the others—circumstances which would more than justify the institution of criminal proceedings against the offender—syphilis has been, and may again be, inoculated by a person pretending to vaccinate, I do not in any degree doubt. Under such circumstances that which purports to be vaccination may be vaccination in nothing but name. But, may the like mischief occur under any different circumstances? Can an educated medical practitioner fall into it by mere mischance, or must he, in order to avoid it, exercise more than average vigilance and skill?

These questions, difficult perhaps at present to answer by any sort of deduction from general pathological principles, and surely not empirically answered by the few published cases in which the vaccinator who has inoculated syphilis declares himself to have been blameless in the matter, receive, fortunately, a sort of practical answer, and, as regards the probabilities of the case, seem quite overwhelmingly negatived, when common experience is appealed to. If our ordinary current vaccination propagates syphilis, where is the syphilis that it propagates? Who sees it? The experience of this department is an entire blank on the subject. For the last ten years we have been in incessant

intimate communication with the different parts of England on details of public vaccination, and, during these years, every one of the about 3,500 vaccination districts into which England is divided has been visited three or four times by an inspector specially charged with the duty of minutely investigating the local practice of vaccination; yet, from this systematic and extremely detailed search for all that has to be said on the subject of vaccination in England, no inspector has ever reported any local accusation or suspicion that a vaccinator had communicated syphilis. Again, our National Vaccine Establishment has been in existence for more than 60 years, vaccinating at its own stations every year several thousands of applicants, and transmitting to other stations supplies of lymph with which every year very many (at present some fifty or sixty) other thousands are vaccinated, who in their turn become sources of vaccination to others; but this vast experience does not, so far as I can ascertain, include knowledge of even one solitary case in which it has even been alleged that the lymph has communicated syphilis. Is it conceivable that these negative experiences could be adduced, if the vaccine lymph of children with latent hereditary syphilis were an appreciable danger to the public health?

But our special departmental experience, immensely large though it is, constitutes only a fraction of the overwhelming evidence which may be adduced to the same general effect. Thirteen years ago it devolved upon me (as Medical Officer of the then General Board of Health) to make the widest possible enquiries, both of scores of public departments and institutions, and also of many hundreds of individual practitioners, in our own country and on the continent of Europe, with a view to elicit all existing experience on the validity of objections which had been alleged against vaccination; and on that occasion I of course gave great prominence to the point which is here raised. One of the four questions which I circulated was the following:—"*Have you any "reason to believe that lymph, from a true Jennerian vesicle, "has ever been a vehicle of syphilitic, scrofulous, or other*

"*constitutional infection to the vaccinated person; or that "unintentional inoculation with some other disease, instead "of the proposed vaccination, has occurred in the hands of a "duly educated medical practitioner?*" The answers which I received on this, as on each of my other points, from 542 members of my profession, are all printed in alphabetical succession in the Appendix of the Report which I made in 1857 on the results of my inquiry.* The answers, as regards syphilitic inoculation, are only just short of being an absolutely uniform *No;* partly because some expression was given to merely speculative opinion, and partly because, in a very few individual instances, a practitioner believed he had known a case or cases of unintended infection. Whether in these most isolated instances the observer had been duly on his guard against the very probable sources of fallacy to which I have above referred, and whether, so far as he had been so, the imputed syphilitic inoculation was a fact of surgical *mala praxis,* are points which I need not here discuss; for the alleged cases were thrown into real insignificance by their relation to the main body of testimony. Men of the largest and oldest consulting practice in the United Kingdom, men who were believed to have seen every variety of disease and accident to which the human body is liable, our leaders who had for years taught medicine and surgery to the mass of the profession, physicians and surgeons of our largest metropolitan and provincial hospitals in England and Scotland and Ireland, physicians who had specially studied the diseases of infancy, surgeons who had specially studied the inoculative diseases, pathologists of distinguished insight and learning, men of all these sorts, scores on scores of them, had never in their experience "had reason to believe or suspect" any such occurrence as my question described. In the alphabetical series to which I have referred, there may be read all the most eminent British names of thirteen years ago, certifying to such negative experiences; there may be read too that equally

* Papers relating to the History and Practice of Vaccination; presented to both Houses of Parliament by command of Her Majesty; 1857, 4to., pp. 280.—J.S.

negative in Paris had been the vast experience of Chomel and Moreau and Rayer and Ricord and Rostan and Velpeau; equally negative at Vienna, that of Hebra and Oppolzer and Sigmund. And in here recurring to that very remarkable mass of testimony, I may repeat the remark which my former review of it suggested to me:—"Obviously one, at "least, of two conclusions is inevitable; either it is the case "that, even with reprehensible carelessness as to the source of "lymph, vaccination (so long as in any sense of the word it "is vaccination) cannot be the means of communicating any "second infection; or else it is the case that in the world of "vaccinators care is almost universally taken to exclude that "possibility of danger. To the public, perhaps, it matters "little which of these conclusions is true."

Though it would be the merest idleness to take again now the sort of formal census of medical opinion which I took thirteen years ago, I may state that ever since that time I have felt it among my strictest duties to be generally watchful and interrogative on the present subject; all the more so, as the period has been one of extraordinary pathological progress, and especially has brought to light very important new knowledge concerning syphilis; and I have every reason to believe that a present census of personal experience in this country would give just the same practical results as those which accrued from the former inquiry. Indeed in a few very important directions I have satisfied myself that it does so. I may mention, for instance, that the Army Medical Department has during the last eleven years had cognizance of 151,316 (adult) vaccinations and re-vaccinations performed on the soldiers and recruits of Her Majesty's service: where, from the nature of the case, the subjects of the proceeding are persons who afterwards permanently remain under medical observation, and in whom therefore no syphilitic consequence of vaccination could possibly escape notice: where moreover the chances of latent constitutional syphilis in subjects furnishing the lymph must be about the same as among our civil population: but that in all this vast and critical experience, so far as is known to Dr. Balfour—the eminent and laborious

annual reporter on the diseases of the British army, no single case has ever been alleged of a soldier syphilized by vaccination. Another fact too which I take particular pleasure in mentioning is this. Among the extremely few answers in 1857, where respondents had seen syphilitic effects which they believed to have arisen from vaccination, one had particular importance in my eyes, as coming from a surgeon of specially large opportunities, and (as I personally knew) of very special accuracy and skill of observation, Mr. Jonathan Hutchinson: whose answer was—"I believe that I have seen four or five "instances in which local syphilitic affections [and in one or "two of them with constitutional consequences] were induced "by vaccination performed under ordinary circumstances and "by duly qualified men." I have at the present opportunity referred again to Mr. Hutchinson on the subject, anxious to get the result of his greatly increased experience, and knowing quite well that, after his attention had once been drawn to the point, cases bearing on it would not be likely to escape his notice. He now answers as follows:—"In the 13 years "and upwards which have passed since I made the communi- "cation which is given at page 73 of the 'Papers relating to "'the History and Practice of Vaccination' I have not met "with a single case, either at the Hospital for Diseases of the "Skin, or elsewhere, in which I have had any reason to "believe or suspect that syphilitic disease had been commu- "nicated by vaccination. The origin of the diseases which "have come under my observation among the children at the "hospital for skin-diseases has, of late years especially, been "with me an object of particular investigation. I doubt "also whether, had I investigated the cases to which I "have referred in the 'Papers, &c.,' with my present know- "ledge and experience, I should have formed altogether "the opinions respecting their nature or origin therein "expressed."

Indisputable certainties, which anyone can verify for himself, are: first, that year by year millions of vaccinations are performed in Europe with scarcely a solitary accusation transpiring that syphilis has been communicated by any of

them; and, secondly, that physicians and surgeons who could not fail to see such cases in abundance, if such abundance were a reality, concur with almost absolute uniformity, hundreds of them together, in declaring they have never in all their experience seen even a single case of the kind. Surely for every practical purpose certainties like these are our best guides; and with such certainties in our knowledge, it would be the merest pedantry to insist on infinitesimal speculative uncertainties, as though our English system of vaccination deserved mistrust because we are puzzled to explain some alleged syphilizations on the continent. And if 13 years ago I was able to show that vaccination, as till then administered in England, had not deserved public mistrust in the matter here under consideration, what much stronger claims on public confidence, in that as in all other respects, may be advanced for our present system!

Recent improvements of English system of vaccination.

The system of 1843–57 (as described in my above quoted special report, and retrospectively again in the second annual report of this department) was so extremely defective, and so unguarded by any kind of supervision, that, though happily syphilis was not among its fruits, other kinds of mischief, and at least very much inefficiency, might, with comparative justice, have been attributed to it.*

Such were the circumstances of the case when my Lords, by the Public Health Act, 1858, were first called upon to superintend the public vaccination of this country; and the successive steps which my Lords have taken in fulfilment of this responsibility, and which may be traced in ample detail in the annual reports of the department, have, I venture to say, gone far towards giving this country such properly-administered vaccination as England, before all countries of the world, surely ought to have. I confine myself here to mentioning those of their Lordships' acts which have aimed at providing every possible security against any such sorts of malpractice as I have adverted to in the present report.

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* See History and Practice of Vaccination, page 289.—J.S.

The Act of 1858 authorized their Lordships to frame regulations "for securing the due qualifications of persons to be "hereafter contracted with by guardians and overseers of "unions and parishes in England for the vaccination of "persons resident in such unions and parishes, and for "securing the efficient performance of vaccination by the "persons already or hereafter to be contracted with as "aforesaid;" and to "cause to be made such inquiries as "they see fit in relation to....the observance of the "regulations and directions issued by them under this Act."

Evidently a first rule to be made by their Lordships under the above authorization, was that in future no one should be admissible as a contractor, nor be allowed to act as deputy to a contractor, without producing evidence that he had sufficiently studied vaccination; but no such rule could be of effect till a preliminary difficulty had been overcome—the difficulty, namely, of procuring satisfactory evidence that the candidate for a vaccination-contract or deputyship really had learnt the business which he wished to undertake. The ordinary apparatus of medical diplomas or licenses was here inapplicable; for the various licensing corporations in England had neither the habit nor the means of practically inquiring whether their respective candidates had gained a proper knowledge of vaccination; and hitherto, as already stated, there existed no schools where vaccination could be duly learnt, and whence certificates of proficiency could be received. Accordingly, if the intentions of the legislature were to be fulfilled, it was preliminarily needful that special establishments should be organized where vaccination could be studied under skilled guidance, and whence candidates, after due instruction or examination, could obtain such certificates of proficiency as would show them qualified to be contracted with (provided they had the necessary professional licenses) for the performance of public vaccination. Proceedings which my Lords took in 1859, and which are particularised in my report for that year, made all required provisions in these matters. Certain carefully-selected public vaccinators, officiating in places where there are recognized medical schools, were

authorised to act for their Lordships' purpose as teachers of vaccination, at whose "educational vaccinating-stations" any medical student might thoroughly learn vaccination, and acquire a certificate of having done so: and, this preliminary arrangement being concluded, my Lords issued their rule that no future entrant on the medical profession should be eligible as a contractor for vaccination, or be allowed to act as deputy for a contractor, unless he, in addition to his general qualifications, "produce a *special certificate,* given "under such conditions as the Privy Council from time to "time fix, by some public vaccinator whom the Privy Council "authorise to act for the purpose, and by whom he has "been duly instructed or examined in the practice of vacci-"nation, and all that relates thereto."*

Secondly, as the above rule could only relate to future contractors for vaccination, and even to them only in so far as they were not already members of the medical profession, my Lords issued certain technical instructions which all public vaccinators were required to follow, and which would supply a public standard of what in their Lordships' opinion was "properly performed vaccination." Some of these instructions bear so specially on my present subject-matter that I beg leave to draw particular attention to them:—"1. Except there be "immediate danger of small-pox, vaccinate only subjects who "are in good health. Satisfy yourself that there is not any "eruption behind the ears, or elsewhere on the skin; nor any "febrile state; nor any irritation of the bowels. Under no "circumstances vaccinate a subject to whom, from the state "or prospects of his health, vaccination is likely to prove "injurious . . . 6. Consider yourself strictly responsible for "the quality of whatever lymph you use or furnish for vac-"cination. Take lymph only from subjects who are in good "health, especially satisfying yourself that they are free from "eruption on the skin. Take it only from well-characterised, "uninjured vesicles. Do not take it from cases of re-vaccina-"tion. Take it (as may be done in all regular cases on the

* See above, page 335.—Ed.

" day week after vaccination) at a time when the vesicles are " plump, either just before the formation of the areola, or, at " the latest, not more than 24 hours after the areola has " begun to form . . . 7. In vaccinating from arm to arm, and " still more in proceeding to store lymph, avoid draining any " vesicle which you puncture . . . 8. Scrupulously observe in " your inspections every sign which tests the efficiency or " purity of your lymph. Note any case wherein the vaccine " vesicle is unduly hastened or otherwise irregular in its " development, or wherein any undue local irritation arises; " and if similar results ensue in other cases vaccinated with " the same lymph, desist at once from employing it . . . 9. If " from any cause your supply of lymph ceases, or becomes " unsuitable for further use, take immediate measures for " obtaining a new supply:—10. Keep in good condition the " lancets or other instruments which you use for vaccinating, " and do not use them for other surgical operations. Supplies " of lymph, guaranteed by the National Vaccine Board, are " furnished on application to all medical practitioners." In the present connexion too it deserves notice, that, among their Lordships' regulations which have been in force for the last ten years, is one requiring the public vaccinator in every case where he vaccinates to particularise in a special column of his register the lymph-source from which the vaccination is done: so that if afterwards in any case an accusation against the lymph should arise, the question of the fitness or unfitness of source can at once be properly investigated.*

Thirdly, my Lords in 1860 began on a small scale, and by 1862 had brought into full work, arrangements for systematically inspecting the local machinery in force throughout the country for purposes of public vaccination, and the actual

* A capital illustration of the advantages of this system was given last year in the Bow Street Police Court, as may be read in the "*Times*" of Sept. 11th and 16th, 1869. A mother had appeared in the court, bitterly complaining that loathsome disease had been given to her infant by a public vaccinator's use of impure lymph. The charge was immediately investigated from this department, and, as result, proof was publicly given that the accusation was entirely unjust; but parts of this proof could not possibly have been had, except for the clues which, as above described, were existing in the vaccinator's register.—J.S.

results obtained by the machinery in each district. Five of my annual volumes (from the third to the seventh inclusive) contain details, which of course it has not been necessary to continue in subsequent volumes, of the minute local examinations which were made during those years, of the faults which were found, and of the reforms which were recommended: and, to illustrate in only one particular the minuteness of these inquiries, I may note that the reports for only 1863–4 contain record of (among other things) the personal examination of some 260,000 children, and of the evidence given by their respective vaccination-marks as to the quality of the vaccination which each vaccinated child had undergone.

No one can doubt but that the work of these years, during which every public vaccinator of England found his work subjected to skilled criticism, and was assisted to understand the causes of whatever shortcomings were found in it, must have been of substantial influence on the trustworthiness of English vaccination. It represented the beginning of a new era; and consequently in 1865, when a second series of inspections began, evidence of very extensive, and often of very great improvement in the quality of our public vaccination was manifest. But hitherto the vaccination-law of England had very serious defects, which in some cases actually impeded, and in other cases left without necessary assistance, the endeavours which my Lords were making to perfect the system. In 1867 those defects were removed by the new Vaccination Act of that year; and from 1867 there consequently date further very considerable measures of improvement. Every vaccination-district in England is now visited once in every two years, the quality of its vaccination minutely examined by the inspector whom their Lordships send, and all necessary advice and assistance given to local officers and authorities as to whatever may improve the vaccination. Nor is this all. For, during the last four years an entirely new influence has been at work in the system of pecuniary awards to meritorious public vaccinators, which (as described in my ninth report) the liberality of Parliament has empowered my Lords to administer, and some details of which

for the year 1869 are mentioned at a previous page of my present volume.

Further I have to say that, while since 1858 all the above influences have been powerfully tending to improve the public vaccination of England, so far as dependent on the individual efficiency and zeal of the about 3,500 medical practitioners by whom it is locally administered, exertions equally great have been made by their Lordships to improve other most important relations of the service. Foremost among such work as I here refer to, and of special importance with regard to the quality of public vaccination, are the measures which my Lords have taken to improve the local organisations which concern the maintenance of local lymph supplies. In my departmental memorandum of 1858 [see above, page 343], I explained the nature of an immensely important reform which those organizations were then needing; and my earlier annual reports contained lamentable proofs, both of the very wide extent in which the reform was needed, and likewise of the very imperfect powers which my Lords at that time had to introduce it: but, in 1867, the new Vaccination Act began, in this as in all other respects, an era of greatly accelerated progress. Early in 1868 my Lords issued in relation to this matter definite and imperative regulations, where previously they could at the utmost only suggest; and during the time which has since elapsed, these regulations, with a complete re-inspection of the country, have gone far to establish throughout England the better local arrangements which were required. And I may add that while by these improvements a greatly improved security has been taken for the excellence of local lymph-supplies, my Lords have also taken corresponding measures (which even at the present time are being further developed) to perfect the basis of lymph-supply for their own central distributory establishment.

Considering all the above improvements, made within the last dozen years, in the arrangements of public vaccination of England, and considering especially their bearing on the quality of the vaccination, both as regards the probable efficiency and care of the vaccinator, and as regards the

local arrangements which affect his selection of lymph, I venture strongly to insist on the comparison which it has been my object to draw. And if in 1857 I was able to shew that vaccination, as till then administered in England, had not deserved any such imputation as that which I have here been again discussing, surely I may anticipate that, in the present immensely improved state of the case, no such imputation will be deemed warrantable.

[The **Thirteenth Report, 1870,** contains the usual account of the departmental proceedings with reference to Vaccination, which it is not necessary to reprint.—Ed.]

[From Mr. Simon's contribution to the First Report of the Local Government Board, 1872.]

[It must be explained that though the Report was addressed to the Local Government Board, the proceedings reported in it were for the most part (i.e. down to Aug. 14) proceedings of the *Privy Council*.—Ed.]

1. Small-Pox and Vaccination.

Small-pox Epidemic.

1. In regard of business concerning the Public Health, the year 1871 was chiefly remarkable through the prevalence, first in London, and afterwards generally in England, of a far severer epidemic of Small-pox than any which had been witnessed of late years, or probably since the general use of vaccination. It appears to have killed in England, within the year, nearly 23,000 persons, including 7,876 of the population of London; and even at the present time there is no reason to suppose that the epidemic has nearly completed its course.

The severity of this epidemic became evident in two different ways; first, by the extraordinary multitude of persons whom the disease attacked; and, secondly, by the

extraordinary intensity of the disease in its individual cases. To illustrate the latter point, it may suffice to mention that at the London Small-pox Hospital, where 950 cases were treated during the year, the deaths in proportion to the cases were nearly twice as many as the average experience of the hospital for thirty-two years would have prognosticated.

The present great epidemic of small-pox is not being confined to our own country; and though authentic information cannot yet be quoted as to all the diffusion of the disease in continental Europe, facts enough are known to justify the belief that at least in the north-western parts of the continent the power of the epidemic has been, or is, as great as here. Also, though the time has not yet come for attempting to sum up with exactness the lessons of this epidemic in reference to the value of vaccination, yet, even already, there are reported some very suggestive facts for comparison. In the chief towns of Holland, where vaccination is non-compulsory, and where, as a rule, the children are long left unvaccinated,—in Hamburg, with non-compulsory vaccination,—in Paris, where not only vaccination is non-compulsory, but where also, at least some years ago, there were strong grounds for suspecting the quality of much of the current vaccination,—in all these places the epidemic seems to have raged with very much more severity than even in London; and it is stated that Hamburg, which, though having but a tenth part of our London population, suffered nearly two-thirds as many deaths as London, has now, under influence of this terrible suffering, been led for the first time to pass a law of compulsory vaccination.

Proceedings against small-pox.

The proceedings taken in the medical department in 1871 with reference to the epidemic of small-pox, consisted in endeavours to move local authorities to resist the disease in their respective districts by duly administering, first and above all, as specially applicable to the case, the provisions of the vaccination-law, and, secondly, those provisions of nuisance-law which apply to all dangerous infectious disease, and are meant to secure the isolation of the sick and

the disinfection of infected houses and things. As regards the Metropolis, circular letters (see Appendix) were in the month of January addressed to the 30 Boards of Guardians, as the local vaccination-authorities, and to the 39 Vestries and District Boards, as the local nuisance-authorities, urging the measures which ought to be adopted; and during many weeks the department was continuously occupied in inquiring by its inspectors into the measures which were being taken as above in the several districts of the Metropolis, and in giving, where necessary, special advice with reference to particular local circumstances. Subsequently, proceedings of like purpose, but necessarily with less possibility of inspection, were taken in regard of the country generally. A circular letter of advice (see Appendix) was addressed to the 620 extra-metropolitan Boards of Guardians. Afterwards in regard of 165 Unions (see Appendix) where the epidemic was known to have begun, special communications were addressed to the Guardians, and in some cases also to other authorities, pressing the necessary measures; and in the comparatively few cases where alone it was practicable (cases marked in the above list) the inspectors of the department were instructed to communicate personally with the local authorities in relation to such measures.

Hospital accommodation.

The extensive diffusion of small-pox in England, like the great scarlatinal epidemic of two years ago, brought into prominence the evil results of the general want throughout the country of hospital-accommodation for cases of dangerous infectious disease; and in communicating as above with local authorities on steps to be taken against the present epidemic, it was necessary to advert particularly to the need of hospital-accommodation for the sick, and to urge that, if not already existing, it should at once as far as practicable be extemporised. The experience of the department on the indispensable necessity for this provision, as part of any local machinery intended to limit the spread of dangerous infectious disease, and such general suggestions as the department could give on ways to provide the accommodation, were stated for the

information of the local authorities in a special memorandum which I subjoin. See Appendix, No. 42*a*.

Re-vaccination.

Early in the London epidemic it became the duty of the department to issue for general information a memorandum on the use of Re-Vaccination, as an additional safeguard which persons who have been vaccinated in infancy ought in general to adopt at about the age of puberty; and with this memorandum were issued also some suggestions for medical practitioners with regard to the supply of lymph for re-vaccination: of which memoranda I subjoin copies, Appendix, Nos. 41, 42. The epidemic brought into strong relief two popular errors with regard to re-vaccination; first, the error of not having it performed on each person (irrespectively of any immediate alarm of small-pox) on his attaining the above-mentioned age; and secondly, the error of seeking under panic to have it performed indiscriminately again and again. Under the influence of these two errors, the first allowing an indefinite accumulation of postponed cases, and the second giving swarms of needless, or relatively needless, re-applicants, the demand for re-vaccination, under alarm of this great epidemic, has been such as medical practitioners could not by any possibility at once meet without sacrificing the cardinal conditions of safe vaccination. In this connexion I beg particularly to refer to the latter of the above-mentioned memoranda.

[Here follow details of the work of the department in connexion with the superintendence of Public Vaccination, which it is unnecessary to print.—Ed.]

House of Commons Select Committee on Vaccination.

Mr. Forster's Select Committee, and its consequences.

The sitting for more than three months (from February 13th to May 23rd) of a Select Committee of the House of Commons, appointed [on Mr. Forster's motion] to inquire into the operation of the Vaccination Act, 1867, and followed, as it was, first, by the proposal to Parliament of new provisions to secure infantine vaccination and otherwise to amend the law of 1867, and afterwards by the need of special proceedings with reference to the changed state of

the law, involved during nearly all the year large additions to the ordinary business of the medical department.

While the Select Committee was taking evidence, some cases of co-infection of syphilis and cow-pox—cases of such rarity, that even the possibility of the occurrence had hitherto been extensively doubted by the medical profession in this country, came to the knowledge of the medical department, and were brought as undoubted facts to the knowledge of the Committee.* In the interests of truth it was most fortunate that these cases, if ever to happen, should have happened and become known when they did; for previously, though eight sittings of the Committee had been occupied in hearing the evidence of professed complainants against vaccination, the genuineness of this particular possibility seemed likely still to remain in dispute; and it was highly important that the Committee, having to pronounce judgment on the subject of vaccination, should have before it in evidence everything which could truly be objected to the practice. With knowledge of the above cases, however, and after hearing (with much other skilled evidence) the testimony of the eminent surgeon under whose treatment the cases had been, the Committee reported, as one

* [The chapter of accidents was very curious. Most of my own evidence before the Committee had been given on the 24th, 28th and 31st of March; and on the last of those days the Committee rose for Easter. Within a week of that day, and during my temporary absence from London, a group of cases (re-vaccination of adults) in which syphilis had been communicated by vaccination was brought to the knowledge of the late Dr. Seaton, acting for me at the office; and at his judicious suggestion these cases were forthwith put under Mr. Hutchinson's observation and treatment. Dr. Seaton at once informed me of the occurrence, and I of course immediately brought my information before the Chairman of the Committee; who thereupon took the necessary steps to bring before the Committee Mr. Hutchinson's evidence regarding the cases. Mr. Hutchinson's evidence was given on the 9th of May; and by one of the most extraordinary of chances, Mr. Hutchinson, when he appeared before the Committee, had to speak, not only of the original group of cases, but also of a second, and as it proved even more serious, misfortune of the same sort, which had become known to him in the interval, and which he was then engaged in investigating. The history of the two groups of cases was communicated by Mr. Hutchinson to the Royal Medical and Chirurgical Society, in a paper which was afterwards published in the Society's Transactions.—J.S., 1887.]

of its main conclusions, to the House of Commons :—" that, " if the operation [of vaccination] be performed with due " regard to the health of the person vaccinated, and with " proper precautions in obtaining and using the vaccine " lymph, there need be no apprehension that vaccination will " injure health or communicate any disease."

It was of course my duty to inquire fully and minutely into the above mentioned cases, and into the circumstances under which they had occurred, and to consider, particularly with reference to the conduct of public vaccination, whether existing securities against such danger could in any respect be made stronger than they were. For the latter purpose I revised most carefully, and with the best assistance, the technical Instructions under which public vaccinators act in discharge of their duty, and submitted to the Lords of the Council an amended scheme of such Instructions. These, having been approved by their Lordships, were brought into effect by an Order bearing date July 29th, 1871. See Appendix, No. 50.

Appendix No. 41.

Re-vaccination.—Memorandum of Privy Council.

Memorandum of Privy Council on re-vaccination of 1871.

By vaccination in infancy, if thoroughly well performed and successful, most people are completely insured, for their whole life-time, against an attack of small-pox; and in the proportionately few cases where the protection is less complete, small-pox, if it be caught, will, in consequence of the vaccination, generally be so mild a disease as not to threaten death or disfigurement. If however the vaccination in early life have been but imperfectly performed, or have from any other cause been but imperfectly successful, the protection against small-pox is much less satisfactory; neither lasting so long, nor while it lasts being nearly so complete, as the protection which first-rate vaccination gives. Hitherto, unfortunately, there has always been a very large quantity of imperfect vaccination; and in consequence the population always contains very many persons who, though nominally vaccinated and believing themselves to be protected against small-pox, are really liable to infection, and may in some cases contract as severe forms of small-pox as if they had never been vaccinated. Partly because of the existence of this large number of imperfectly vaccinated persons, and partly because also even the best infantine vaccination sometimes in process of time loses more or less of its effect, it is advisable that *all persons who have been vaccinated in infancy should, as they approach adult life, undergo* Re-vaccination. Generally speaking, the best time of life for re-vaccination is

about the time when growth is completing itself, say from 15 to 18 years of age; and persons in that period of life ought not to delay their re-vaccination till times when there shall be special alarm of small-pox. In proportion, however, as there is prevalence of small-pox in any neighbourbood, or as individuals are from personal circumstances likely to meet chances of infection, the age of 15 needs not be waited for; especially not by young persons whose marks of previous vaccination are unsatisfactory. *In circumstances of special danger, every one past childhood, on whom re-vaccination has not before been successfully performed, ought without delay to be re-vaccinated.*

Re-vaccination, once properly and successfully performed, *does not appear ever to require repetition.* The nurses and other servants of the Small-pox Hospital, when they enter the service, are invariably submitted to vaccination, which in their case generally is re-vaccination, and is never afterwards repeated; and so perfect is the protection, that though the nurses live in the closest and most constant attendance on small-pox patients, and though also the other servants are in various ways exposed to special chances of infection, the resident Surgeon of the hospital, during his thirty-four years of office there, has never known small-pox affect any one of these nurses or servants.

Legal provisions for re-vaccination are made in the 8th Section of the Vaccination Act, 1867, and in Section IV. of the Regulations which the Lords of the Council under authority of the Act issued in their Order of February 18th, 1868. Under these provisions, *Re-vaccination is now performed by all Public Vaccinators at their respective Vaccinating Stations;* and, so far as is not inconsistent with the more imperative claims for primary vaccination, *any person who ought to be re-vaccinated may, on applying to the Public Station of the District in which he resides, obtain Re-vaccination at the public expense.*

Appendix No. 42.

Re-vaccination.—Memorandum of Privy Council on Lymph Supply.

Memorandum of Privy Council on lymph supply of 1871.

At any time when exceptional claims for re-vaccination are arising, it becomes essential clearly to understand how the lymph for such re-vaccination is to be supplied.

In regard of lymph supply, re-vaccination unfortunately differs from primary vaccination, in that it contributes nothing to its own support, but that each case of re-vaccination, while requiring to draw lymph from a case of primary vaccination, will itself furnish no available lymph in return; for, even when good vesicles result from re-vaccination, their lymph cannot properly be used for other vaccinations or re-vaccinations. Thus, no wholesale re-vaccination is possible which does not have for its basis a large system of primary vaccination; and as, in England, such a system exists in the hands of the public vaccinators, but, with very rare individual exceptions, not in any other hands, so, our essential security for means of re-vaccination (as well as for means of primary vaccination) is in the system of public vaccinating stations established by law.

At these stations a large majority of all the infantine vaccinations of the country are performed in successive weekly groups; the cases of each vaccinating-day returning a week afterwards to furnish lymph for the arm-to-arm vaccination of a new group. Each well-frequented station is thus a continuous

source of primary lymph-supply, and is able, not only to maintain its own weekly performances of vaccination and re-vaccination, but also to contribute more or less towards the requirements of places where the public stations are too ill-frequented for the maintenance of a continuous supply, and towards the similar requirements of private practitioners. From certain of such stations, carefully selected and superintended, the Medical Department of the Privy Council Office receives regular contributions of lymph, preserved dry on ivory points, or liquid in capillary tubes; and out of the stock thus contributed, the department answers day by day the demands which are made on it for lymph; demands emanating not only from among the many thousand vaccinators, public and private, of the civil population of England, and the other divisions of the United Kingdom, but also from Her Majesty's Army and Navy in all parts of the world, and from the Diplomatic and other Foreign Services, and from the Colonies.

It is essential for the objects which have to be accomplished that this National Vaccine Establishment should be maintained in a solvent condition, as regards all such demands as its constitution is intended to meet; and it is satisfactory to know, as an effect of large improvements which of late years have been made in the system of supply, that the resources of the establishment are now many times greater and more elastic than they have been during any previous epidemic of small-pox, and are fully adequate to meet all such demands as the establishment professes to provide for. It must be remembered, however, that there are certain claims which the establishment is neither meant nor would be able to meet. No central depôt of lymph can pretend to give such separate supplies as will enable each individual practitioner to vaccinate at once large numbers of persons. The principle on which the National Vaccine Establishment proceeds (and has always proceeded) in its distribution of lymph, whether to public or to private vaccinators, is as follows:—*It furnishes each applicant with a sufficiency for the performance of a few first vaccinations, and it expects that the recipient*, so far as the circumstances of his practice render necessary, *will exert himself to vaccinate in series from the beginning which he is thus enabled to make.* This principle is acted on in relation to public vaccinators (as especially in country districts) whenever, from local circumstances, the weekly succession of groups of cases has been interrupted; and no other principle can be worked on a large scale in relation to private vaccinators. If re-vaccinations are in question, they, to any considerable extent, cannot be *immediately* dealt with at the expense of the central depôt. And if the vaccinator, on receiving his packet of preserved lymph, does not use it for starting primary vaccinations, from which afterwards his re-vaccinations could be performed, but, instead of so doing, expends the preserved lymph on some of his claimants for re-vaccination, he must not rely on being able to satisfy other claimants with new supplies from the central depôt.

Where medical practitioners, not being public vaccinators, and not having otherwise in their practice cases for primary vaccination, are called upon to re-vaccinate on considerable scale (as in hospitals, commercial establishments, schools, and even large households) they would generally find it best to make direct application for assistance to the public vaccinator of the district in which they have to act; with whose assistance they may commonly find it in their power to arrange with the parents of children recently vaccinated at the public station, that some of such children shall at the proper time be taken to places where private re-vaccinations have to be performed, so as to furnish from arm to

arm any required quantity of lymph. Generally, too, any private medical practitioner who, from any cause, desires to obtain extraordinary supplies of lymph, will most easily attain his object by applying to the public vaccinator of the district in which he resides. And as public vaccinators, appointed under the Vaccination Act, 1867, are of course free to accept payment for any extra-official work which they may be willing to undertake, private practitioners would probably have no difficulty in obtaining, by voluntary agreement, the assistance of some of these officers as collectors of lymph for private re-vaccination.

It is important for the public to observe that re-vaccination on a large scale is not easily conducted unless in a thoroughly systematic manner, and that individual difficulties in finding lymph for re-vaccination are inseparable from the too general practice of deferring re-vaccination to periods of panic, instead of having it proceed, as it should, regularly and uniformly, in proportion as successive numbers of population reach the proper age for its performance.

Section VIII. of the Vaccination Act, 1867, is as follows:—"The provisions "of the contracts entered into before this Act comes into operation shall not, "after the thirty-first day of December next, apply to the cases of persons who, "having been previously successfully vaccinated, shall be re-vaccinated; but "if the Lords of Her Majesty's Council shall have issued or shall hereafter "issue regulations in respect of the re-vaccination of persons who may apply "to be re-vaccinated, which such Lords are hereby authorized to do, the "Guardians shall pay, in respect of every case of successful re-vaccination "performed in conformity with such regulations under such contracts or under "new contracts entered into after the date hereof, a sum amounting to two-"thirds of the fee payable upon each case of successful primary vaccination."

Section IV. of the Regulations issued by the Lords of the Council in their Order of February 18th, 1868, is as follows:—"The performance of re-vacci-"nation by the Public Vaccinator on persons applying to him for that purpose "shall be limited in each case by the following conditions—(1) that, so far as the "Public Vaccinator can ascertain, the applicant has attained the age of fifteen "years, or, if during any immediate danger of small-pox, the age of twelve "years, and has not before been successfully re-vaccinated; and (2) that, in "the Public Vaccinator's judgment, the proposed re-vaccination is not for any "sufficient medical reason undesirable; and (3) that the Public Vaccinator can "afford vaccine lymph for the purpose without in any degree postponing the "claims which are made on him for the performance of primary vaccination in "his district."

February 6th, 1871.

Appendix No. 42 *a*.

Hospital Accommodation.—Memorandum of Privy Council.

Memorandum of Privy Council on Hospital Accommodation of 1871.

A large part of the mortality of England is caused by diseases which spread readily by infection from person to person; such as scarlatina, typhus, small-pox. In order to prevent the extension of such diseases in neighbourhoods where they have begun, it is of the utmost importance that (in addition to whatever other sanitary precautions may be requisite) every endeavour should be made to separate the sick from the healthy. This object is comparatively easy when

means to attain it are taken early, while cases of the disease are very few; but any interval of delay allows the cases of sickness to multiply, and perhaps at last to become so numerous that endeavours to isolate them cannot succeed.

These considerations are, most of all, important in regard of the poorer parts of the population; because their usually crowded and ill-ventilated dwellings give extreme facilities for infection. And among these classes the sick, generally speaking, cannot be separated from the healthy, except in proportion as proper hospital accommodation has been provided for the purpose.

Power is given by the 37th section of the Sanitary Act, 1866, to the Local Board, Improvement Commissioners, or Town Council, or where there is none of these bodies, to the vestry, to provide "for use of the inhabitants within its "district hospitals or temporary places for the reception of the sick." When this provision has been made, any justice may order the removal to such place of any person suffering from any dangerous infectious disease, if he is without proper lodging or accommodation, or lodged in a room occupied by more than one family, or is on board any ship or vessel.

The present Memorandum is intended for the assistance of health authorities, who, having to secure the isolation that is needed for cases of dangerous infectious disease, but not yet having the requisite hospital accommodation within their districts, would provide such accommodation under the powers of section 37 of the Sanitary Act, 1866, or otherwise.

A condition of the first degree of importance for the usefulness of any such accommodation is that the accommodation shall be ready beforehand. The quantity of accommodation wanted will, of course, be widely different in different cases; and it must be remembered that when two infectious diseases are prevalent in one place at one time, patients having the one infectious disease cannot properly be in the same ward with patients having the other infectious disease. In kind, the accommodation ought, in all cases, to be as good as the authority can reasonably supply. It is believed, however, that, even under these conditions, the cost of providing hospital accommodation, whether for villages or for towns, needs not ever be proportionately great.

(*a.*) As regards villages,—each village ought to have the means of accommodating instantly, or at a few hours notice, say, four cases of infectious disease in at least two separate rooms, without requiring their removal to a distance. A decent four-room or six-room cottage, at the disposal of the authority, would answer the purpose. Or permanent arrangement might be made beforehand with trustworthy cottage-holders not having children, to receive and nurse, in case of need, patients requiring such accommodation. Two small adjacent villages (if under the same nuisance authority), might often be regarded as one.

When, in a village, such provision as this has been made by the authority, and cases of disease in excess of the accommodation occur, the sick must not be crowded together, but temporary further provision must be made for them. The most rapid and the cheapest way of obtaining this further accommodation, may often be to hire other neighbouring cottages; or in default of this, tents or huts may be erected upon adjacent ground.

(*b.*) In towns, hospital accommodation for infectious diseases is wanted more constantly, as well as in larger amount, than in villages; and in towns there is greater probability that room will be wanted at the same time for two or more infectious diseases which ought not to be treated in the same ward. The permanent provision to be made in a town, in order to obtain reasonable security

against the spread of infectious diseases, should consist of not less than four rooms, in two separated pairs; each pair to receive the sufferers from one infectious disease, the men and women of course separately. The number of permanent beds to be supplied must depend upon various circumstances, chiefly upon the size of the town; but, as no reasonable amount of permanent accommodation could be trusted always to supply the requirements of a place when infectious disease has actually become epidemic, foresight must in the first instance be used, how, in emergency, additional accomodation can be temporarily given, to meet requirements in excess of the permanent provision; otherwise, the authorities may unexpectedly find themselves obliged to leave ill-lodged infectious cases at their homes, much as if no hospital had been provided. Accordingly, for a town of any importance, the hospital provision ought to consist of a permanent building, having around it space enough for the erection of temporary structures as occasion may require. Considerations of ultimate economy make it wise to have the permanent building equal to somewhat more than the average necessities of the place, so that recourse to temporary extensions may less often be wanted. In small towns, for instance, if a hospital, consisting of four wards and the necessary administrative offices, is to be provided, the original expense of making each ward serve for (say) eight persons, will be far less than double that of making the wards for four. And in any case it is well to make the administrative offices somewhat in excess of the wants of the permanent wards; because thus, at little additional first cost, they will be ready to serve, when occasion comes, for the wants of the temporary extensions, and so to save great inconvenience and outlay.

This Memorandum does not propose to deal with the principles on which permanent hospitals should be built; but, in view of the necessity that they should give the greatest possible assistance for the recovery of the sick, it may be useful to observe, that the foremost requisites are the following;—

Accessibility of situation, so that the sick may not be exhausted by long journeys, and, as far as consists with accessibility, an open uncrowded neighbourhood;

Adequate ward-space for each patient, approaching as near as circumstances allow to 2,000 cubic feet, with 144 square feet of floor, for each bed;

Thoroughly good provision for ventilation, *i.e.*, for sufficient unceasing entrance of pure air and of exit of ward air; with arrangements also for immediate change of air in the whole ward, when necessary; and with perfect security against the possibility of any foul air (as from privies and sinks) entering the wards;

Means of warming the ward in winter to a temperature of 60° Fahrenheit, and of keeping it cool in summer;

Means for safely disposing of excremental matters and of foul slops, and for cleansing and disinfecting infected linen and bedding;

Facilities for obtaining, in the use of the hospital, the very strictest cleanliness of every part.

When the pressure of a particular epidemic requires temporary extension of the accommodation, *Huts*, or, in the summer and autumn, *Tents*, erected on the adjacent ground, will sufficiently answer the purpose; and if the administrative part of the original building have been thoughtfully devised, these temporary structures may be of very simple construction.

The *Tents* may be either such as the bell tent or hospital marquee of Her Majesty's army, or one of the various forms of tent and marquee used in civil

life. Huts may be of wood or iron. Both tents and huts need to be carefully arranged and regulated, especially in the following respects:—

As to Tents.—It is essential to secure the dryness of the ground upon which they are pitched, by trenching around and between them, so as to carry off all rainfall and prevent the lodgment of moisture. The tents should everywhere be distant at least a diameter and a half from each other. The floors should be boarded. The approaches should be paved or otherwise prepared, to prevent them being trodden into mud in wet weather. It is especially requisite that abundant proper means be provided for the reception of refuse matters, and that no casting of slops or other refuse upon the ground in the vicinity of the tents be allowed. In the distribution of patients in active stages of disease, not more than one patient should be assigned to a bell tent of the ordinary regulation size, and not more than three such patients to the regulation hospital marquee.* In other forms of tents the number of patients should be regulated in similar proportions.

As to Huts.—Dryness of site is, as in the case of tents, of the first importance. Each hut should be trenched round. Its floor should be raised a foot or a foot and a half from the earth, so as to permit the free under-passage of air; but care must be taken to prevent the lodgment of moisture or impurities beneath the floor. A distance not less than three times the height of a hut should intervene between any two huts, and each hut should be so placed as not to interfere with free circulation of air round other huts. In huts, as in permanent buildings for the treatment of infectious diseases, not less than 2,000 feet cubic space, with 144 square feet of floor, should be given to each patient. The ventilation of huts, also, is of equal importance with that of permanent hospital buildings. It is best secured by the combination of side-windows with roof-opening, the latter protected from rain, and running the whole length of the ridge of the roof. The windows, capable of being opened top and bottom, should not be fewer than one to each pair of beds, or in large huts one to each bed, nor should be of less size than the sash-window in common use for houses. The ventilating opening beneath the ridge may have flaps, moveable from within the hut by ropes and pulleys, so that the opening to windward can be closed, if necessary, in high winds. Double-walled wood huts may have additional ventilation by the admission of air beneath this outer and inner wall, and its passage into the interior of the hut through openings with moveable covers at the top of the inner lining. The roof should be covered with waterproof felt; the edges of the felt fastened down by strips of wood, not by nails. The hut should be warmed by open fire-places, fixed in brick stove-stacks placed in the centre of the floor, the flue being carried through the roof.

The sewerage and scavenging arrangements both of *Tents* and *Huts* demand very careful consideration. When the tents or huts are placed within the area of a public system of sewerage and water-supply, no difficulty will arise; for drains may be laid into the public sewer, and waterclosets may easily be adopted. But where no system of sewerage exists, the disposal of excremental matters and other refuse will require special provisions. In regard to excrement-disposal under such circumstances, the best method to adopt is the dry-earth system, or, failing this, a pail system, with careful arrangements for the disinfection and

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* *Regulation Bell Tent.*—Diameter, 14 ft.; height, 10 ft.; area of base, 54 square ft.; cubic space, 513 ft.—J.S.

Regulation Hospital Marquee.—Length, 29 ft.; width, 14 ft.; side walls, 5 ft. 4 in.; height to ridge, 11 ft. 8 in.; cubic capacity, a little over 3,000 ft.—J.S.

subsequent disposal of the excrementitious matter. (See the Departmental Report, *On certain Means of preventing Excrement Nuisances in Towns and Villages.*) All slops and other refuse should be deposited in metal pails, and removed from the tents and huts at frequent intervals, and so disposed of as not to become a nuisance. Too much attention cannot be given to the careful scavenging of tents and huts, and to the proper disposal of the refuse from them; and the servant or servants to whom the duty is assigned should be under very vigilant supervision.

Appended is a plan of a temporary hospital hut for male and female patients, and a section showing the construction of the double-walled regulation military hospital hut. If no cottage or other building has been adapted permanently for the administrative purposes, or can be rendered available for them, the kitchen and other necessary offices (larder, wash-house, bedding and foul linen stores, additional nurses' accommodation, nurses' watercloset or pail-closet, dead house, &c.) are most readily provided by simply constructed huts or tents, conveniently arranged near the huts or tents which contain the sick.

Medical Department of the Privy Council Office,
August 1871.

Appendix No. 50.

Instructions for Vaccinators under Contract.

Instructions for vaccinators issued in 1871.

(1.) Except so far as immediate danger of small-pox may require, vaccinate only subjects who are in good health. As regards infants, ascertain that there is not any febrile state, nor any irritation of the bowels, nor any unhealthy state of skin; especially no chafing or eczema behind the ears, or in the groin, or elsewhere in folds of skin. Do not, except of necessity, vaccinate in cases where there has been recent exposure to the infection of measles or scarlatina, nor where erysipelas is prevailing in or about the place of residence.

(2.) In all ordinary cases of primary vaccination, if you vaccinate by separate punctures, make such punctures as will produce at least four separate good-sized vesicles, not less than half an inch from one another; or, if you vaccinate otherwise than by separate punctures, take care to produce local effects equal to those just mentioned.

(3.) Direct care to be taken for keeping the vesicles uninjured during their progress, and for avoiding afterwards the premature removal of the crusts.

(4.) Enter all cases in your register on the day when you vaccinate them, and with all particulars required in the register up to column 9 inclusive. Enter the results on the day of inspection. Never enter any results which have not been inspected by yourself, or your legally qualified deputy. In cases of primary vaccination, register as "successful" only those cases in which the normal vaccine vesicle has been produced; in cases of re-vaccination, register as "successful" only those cases in which either vesicles, normal or modified, or

papules surrounded by areolæ, have resulted. When the vaccination of an unsuccessful case is repeated, it should be entered as a fresh case in the register.

(5.) Endeavour to maintain in your district such a succession of cases as will enable you uniformly to vaccinate with liquid lymph directly from arm to arm; and do not, under ordinary circumstances, adopt any other method of vaccinating. To provide against emergencies, always have in reserve some stored lymph; —either *dry*, as on thickly-charged ivory points, constantly well protected from damp; or *liquid*, according to the method of Dr. Husband of Edinburgh, in fine, short, uniformly capillary (not bulbed) tubes, hermetically sealed at both extremities. Lymph, successfully preserved by either of these methods, may be used without definite restriction as to time; but with all stored lymph caution is necessary, lest in time it have become inert, or otherwise unfit for use. If, in order to vaccinate with recent liquid lymph, you convey it from case to case otherwise than in hermetically-sealed capillary tubes, do not ever let more than eight hours intervene before it is used.

(6.) Consider yourself strictly responsible for the quality of whatever lymph you use or furnish for vaccination. Never either use or furnish lymph which has in it any, even the slightest, admixture of blood. In storing lymph, be careful to keep separate the charges obtained from different subjects, and to affix to each set of charges the name, or the number in your register, of the subject from whom the lymph was derived. Keep such note of all supplies of lymph which you use or furnish, as will always enable you, in any case of complaint, to identify the origin of the lymph.

(7.) Never take lymph from cases of re-vaccination. Take lymph only from subjects who are in good health, and, as far as you can ascertain, of healthy parentage; preferring children whose families are known to you, and who have elder brothers or sisters of undoubtful healthiness. Always carefully examine the subject as to any existing skin-disease, and especially as to any signs of hereditary syphilis. Take lymph only from well-characterised, uninjured vesicles. Take it (as may be done in all regular cases on the day week after vaccination) at the stage when the vesicles are fully formed and plump, but when there is no perceptible commencement of areola. Open the vesicles with scrupulous care to avoid drawing blood. Take no lymph which, as it issues from the vesicle, is not perfectly clear and transparent, or is at all thin and watery. From such a vesicle as vaccination by puncture commonly produces, do not, under ordinary circumstances, take more lymph than will suffice for the immediate vaccination of five subjects, or for the charging of seven ivory points, or for the filling of three capillary tubes; and from larger or smaller vesicles take only in like proportion to their size. Never squeeze or drain any vesicle. Be careful never to transfer blood from the subject you vaccinate to the subject from whom you take lymph.

(8.) Scrupulously observe in your inspections every sign which tests the efficiency and purity of your lymph. Note any case wherein the vaccine vesicle is unduly hastened or otherwise irregular in its development, or wherein any undue local irritation arises; and if similar results ensue in other cases vaccinated with the same lymph, desist at once from employing it. Consider that your lymph ought to be changed, if your cases, at the usual time of inspection on the day week after vaccination, have not, as a rule, their vesicles entirely free from areolæ.

(9.) Keep in good condition the lancets or other instruments which you use for vaccinating, and do not use them for other surgical operations. When you

vaccinate, have water and a napkin at your side, with which invariably to cleanse your instrument after one operation before proceeding to another.

(Signed) JOHN SIMON.

N.B.—Supplies of lymph are furnished to medical practitioners on personal application at 3, Parliament Street, London, S.W., between the hours of 12 and 2 ; or by letter (unstamped) addressed as follows :—

To the Medical Officer of the Privy Council,
3, Parliament Street,
London, S.W.
National Vaccine
Establishment.

[The Second Report of the Local Government Board, published in 1873, contains a short statement by Mr. Simon, which needs not here be reprinted, of the departmental proceedings in regard of vaccination during the year 1872. Afterwards Mr. Simon began his *New Series* of Reports ; and the vaccination proceedings of 1873, 1874, and 1875, are detailed in Nos. I., IV., and VII. of that series. In No. IV. (reprinted below) Mr. Simon gives a full recapitulatory account of the English system of public vaccination, with the improvements which had been made in it: seeking to contrast the vigorous efforts which Government made for the prevention of small-pox with the comparatively trifling efforts it made for the prevention of other diseases. That passage is left *in situ* (where it forms part of an argument) in preference to transferring it to the present page; and it is not thought necessary to reprint, from the other numbers of the New Series, the passages which relate to annual details of vaccination-superintendence.—ED.

LONDON CHOLERA EPIDEMICS

OF

1848–9 & 1853–4.

ON THE LONDON CHOLERA-EPIDEMICS OF 1848–9 & 1853–4, AS AFFECTED BY THE CONSUMPTION OF IMPURE WATER.

A REPORT, addressed (May 1856) to the President of the General Board of Health by the Medical Officer of the Board.*

SIR,

HAVING at your desire examined certain statistical materials, lately compiled in this Department, I now beg leave to report to you thereon; premising only a few words on what gave rise to that compilation.

The London Cholera Epidemics of 1848-9 and 1853-4.

You will probably remember that, during the late epidemic of cholera, Sir Benjamin Hall (then President of this Board) convened a *Medical Council* to advise him in relation to the public health; which Council deputed certain of their number as a *Committee for Scientific Purposes*, to suggest the institution and review the result of such inquiries as might seem likely to elucidate the nature of the prevailing disease; and that the Committee thus originated (consisting of Dr. Arnott, Dr. Baly, Dr. Farr, Professor Owen, and myself) had the honour of presenting to Sir B. Hall, on the 14th July last, a final Report on investigations which were then concluded.

In one important particular this Report was of necessity incomplete. Our Committee had thought it of importance

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* [In the summer of 1854, before the time when the Committee for Scientific Purposes suggested the statistical inquiry to which this Report relates, the late Dr. John Snow had already made an extensive personal inquiry in the South London districts, with regard to the water-supply of the houses in which deaths by cholera had then occurred; and no doubt the Committee was well aware of the important facts which Dr. Snow had ascertained. For those facts, and for Dr. Snow's important teachings on the general question, the reader is referred to the second edition (1855) of Dr. Snow's work, *On the Mode of Communication of Cholera*. Also I would refer to the observations which Dr. Snow made on the present Report in a paper contributed by him to the *Journal of Public Health*, in October 1856.—J.S., 1887.]

to inquire as fully as possible into the sanitary influence of different qualities of water-supply; especially into the power of unclean drinking-water to aggravate the epidemic ravages of cholera. With this view—under circumstances which offered peculiar opportunities of attaining a conclusive result—we had suggested a particular statistical inquiry. Copious details of information had been in consequence collected; but these could not be brought into an available form against the time when our Report was made, and we were therefore reluctantly obliged to construct it without reference to them.

These are the materials, which—at length completed according to the intention of the Committee—you have done me the honour of referring for my Report. Accordingly I beg to lay before you the subjoined summary tables;* which, as embodying their more important results, constitute the definite reply to a great sanitary question: and in proceeding to comment on these, I revert to that point of view in which the plan of investigation was first conceived.

As often as Asiatic cholera had been epidemic in London, it had been observed to prevail, with especial severity, in certain registration-districts on the south side of the river; viz., in St. Saviour's, St. Olave's, and St. George's, Southwark, in Bermondsey, Newington, Lambeth, Wandsworth, Camberwell, and Rotherhithe.

It is to these nine districts that the inquiry was addressed, and they suggested themselves as the best field for observation, not only because of their high epidemic mortality, but because in them, if anywhere in London, there was to be gathered conclusive evidence for a verdict on the matter at issue;—for a verdict, which should acquit or inculpate certain qualities of water-supply, as bearing on the local prevalence of cholera.

Commonly, in attempting such inferences, the inquirer is baffled by difficulties, which render exact conclusions impossible: for populations drinking different waters will often

* It is not considered necessary to reprint the summary tables here referred to.—Ed.

be living in different circumstances of wealth, comfort, occupation, cleanliness, soil, climate. But in the present case there was a singular freedom from such sources of embarrassment. Throughout the investigated districts masses of similar population were dwelling side by side; and the exterior influences which affected them were, with a single exception, apparently identical.

The one varying condition was the quality of water, as consumed in different households. For throughout those southern districts of London, two great competing water-companies had in past times canvassed house by house for customers; their rival mains were still branching within the same area, often running parallel in the same streets; and during the late invasion of cholera (though now happily the difference has ceased) these two systems of pipes were respectively charged with very different waters.

If, during the epidemic prevalence of cholera, persons consuming pure water are less liable to suffer the disease than persons consuming foul water, surely there might be expected some striking difference between the death-rates of two populations respectively drinking from the Thames at Ditton and from the Thames at Battersea.

And such were the sources of supply of the two companies referred to; *the Lambeth Company* pumping from the higher part of the river, the *Southwark and Vauxhall Company* from the lower; the former furnishing as good a water as any distributed in London, while the latter was purveying perhaps the filthiest stuff ever drunk by a civilized community.

In the *Report of the Committee for Scientific Inquiries*, the contrast of these waters was shown. Microscopical and chemical observations were adduced, as proving the almost incredible foulness of that supplied by the Southwark and Vauxhall Company; how it was not only brackish with the influence of each tide, but contaminated with the outscourings of the metropolis, swarming with infusorial life, and containing unmistakeable molecules of excrement.

In reference to the comparison which had to be made, it is especially important to observe, that the tenantries of these

two great companies were not set on different parts of the South London area, each isolated from the other. On the contrary, the two populations were, so to speak, mutually interfused. Of 31 sub-districts into which the large space is divided, only 8 were monopolized by a single water-company; while of the remaining 23 each was supplied, sometimes in equal proportion, by one company and the other.

It likewise deserves notice, that the materials for comparison were not on a small scale. It was not village against village. The investigated districts comprise about a fifth of the entire population of London. They contained in 1849 about 466,000 persons, and in 1854 about 511,000.

When, at the latter period (after the termination of the cholera-epidemic) the water-supply was investigated, nearly 25,000 houses could be shown to deriue their water-supply from the Lambeth Company; nearly 40,000 from the Southwark and Vauxhall Company; while regarding the remainder (many supplied by pumps and wells) no certain information could be got.

Such were the materials of comparison, so like—except for the one unlikeness of water-supply—and at the same time so ample, as to promise unique facility for determining the matter at issue; and the very decisive results which have been obtained justify the hope with which this laborious inquiry was commenced.

In the 24,854 houses supplied by the Lambeth Company, comprising a population of about 166,906 persons, there occurred 611 cholera deaths, being at the rate of 37 to every 10,000 living. In the 39,726 houses supplied by the Southwark and Vauxhall Company, comprising a population of about 268,171 persons, there occurred 3,476 deaths, being at the rate of 130 to every 10,000 living.

The population drinking dirty water accordingly appears to have suffered 3½ *times as much mortality as the population drinking other water.*

I am not aware of any fallacy which can much affect this comparison; and I am the more persuaded of its substantial justice, as I find on detailed examination that the same general results are represented (see Tables II. and III.) in almost every separate line of the figures.

Further, if the number be reduced, by omitting from the comparison 11 sub-districts which are almost monopolised by the Southwark and Vauxhall Company; so that there remain (see Table, No. IV.) 20 sub-districts, with a population of more than 365,000 persons, almost equally supplied by the two companies; it is still found, nearly as before, *that the consumers of the cleaner water suffered not a third as much as their neighbours.*

Perhaps the real significance of these totals is best shown by an examination of the details embodied in them; and, for a convenient instance of this kind, there has been prepared a table (No. V.) which illustrates, in respect of 45 streets, the method and materials of comparison. In every one of these streets, the mains of the rival companies run side by side, each supplying its own proportion of houses; so that, although in any one street the number of houses may be unequally divided between the companies, the respective totals are equal—1,517 houses supplied by the Lambeth, 1,517 by the Southwark and Vauxhall Company.

Here then are 3,034 houses, with about 20,000 inmates, divisible, as it were, into two populations, each the exact counterpart of the other, except in the one particular of water-supply. *One of these populations lost* 57 *persons by cholera; the other lost* 164.

Hitherto it has been shown only that in the epidemic of 1853–4, a very large population drinking foul water suffered from cholera more than three-fold as much as a similar population drinking cleanly water.

But this evidence is only a part of the case. It admits of being greatly strengthened by a second group of facts, which the statistical tables exhibit. For the death-registers have been analysed with a view not only to the epidemic visitation

of 1853–4, but also to that of 1848–9. It was thought proper to see how far any discoverable influence of foul water had been constant to both occasions; and this comparison is of singular interest for our purpose, because the Lambeth Company, which in 1854 gave the superior water, was in 1848–9 purveying even a worse supply than that of the Southwark and Vauxhall Company.

It has already appeared that the tenantry of the Lambeth Company (a population of 166,906, comprised in 24,854 houses) lost by the epidemic of 1853–4, 611 persons. By the epidemic of 1848–9, in the same houses (or rather, in as many of them as then existed) the deaths were 1,925.

The earlier figures showed that this population suffered in 1853–4 not a third as much as its neighbours: the present figures give the further fact—*that it suffered also not a third as much as at the time of its unreformed water-supply.*

On the other hand, the Southwark and Vauxhall Company, which pumped an impure water in 1848–9, pumped even a worse water in 1853–4;—worse, because the larger population and more extended drainage of London had given it a denser infusion of sewage, and a more revolting unfitness for drink.

Accordingly, in 1853–4, their tenantry suffered 3,476 deaths, against 2,880 registered in 1848–9 for as many of the same houses as were then existing. In this large increase, half would probably be the utmost proportion for which new houses could account; so that on this assumption, although the general metropolitan pressure of the epidemic in 1853–4 was considerably lighter than in 1848–9, the houses supplied by the Southwark and Vauxhall Company in the late epidemic *suffered probably* 10 *per cent. higher mortality than the same houses in* 1848–9.

In short (corrected, as far as possible, for difference of time) the comparison of the two populations in the two epidemics stands thus:—*In the one population* (notwithstanding a generally lighter invasion of the disease) *the cholera death-rate rose from* 118 *to* 130: *in the other it fell from* 125 *to* 37.

And what was the only discoverable difference of condition between these two populations? The one had improved its water-supply to comparative excellence; the other drank from even a filthier source than before.

To these facts may be added others not yet adverted to.

In collecting the materials for tabulation, it was thought necessary to extract from the register, not only the entries of death by cholera, but likewise those of death by DIARRHŒA; and the latter information has been tabulated in precisely the same manner as the former.

Reference to Tables VI. and VII. will show that the results obtained in this branch of the investigation repeat on a smaller scale the conclusions already suggested.* In houses supplied in 1854 with water by the Lambeth Company, the death-rate from diarrhœa per 10,000 of the population was 21; in houses supplied by the Southwark and Vauxhall Company, it was 33. Or, *the population drinking foul water suffered* 57 *per cent. more diarrhœal mortality than the population drinking other water.*

And in comparing, with every possible correction, the respective sufferings of these two populations in the two epidemics, we find that on the second occasion diarrhœa, like cholera, pressed more heavily on the one population, though much more lightly on the other. Among the tenantry of the Lambeth Company *the diarrhœal death-rate, which in* 1853–4 *was* 21, *had in* 1848–9 *been* 29: among the tenantry of the Southwark and Vauxhall Company *this rate, which in* 1853–4 *was* 33, *had in* 1848–9 *been only* 27.

In some elements of these comparisons there may be trifling sources of error; but none, I believe, which can modify—much less vitiate—the general result. Scarcely under any circumstances, indeed, are the physiological sciences suscep-

* It must be remembered that diarrhœa, unlike cholera, is always present in this country, and that some proportion (hitherto undetermined) of its total amount is irrespective of local sanitary conditions. If air and water were ever so pure, there would still be occurring a certain mortality from diarrhœa, due to tubercular and other irritations of the intestinal canal.—J. S.

tible of greater certainty, than that which seems here to be justified. An experiment, at which mankind would have shuddered if its full meaning could have been prefigured to them, has been conducted during two epidemics of cholera on 500,000 human beings. One half of this multitude was doomed in both epidemics to drink the same fecalized water, and on both occasions to illustrate its fatal results; while another section—freed in the second epidemic from that influence which had so aggravated the first, was happily enabled to evince by a double contrast the comparative immunity which a cleanlier beverage could give. By this experiment, it is rendered in the highest degree probable, that, *of the* 3,476 *tenants of the Southwark and Vauxhall Company who died of cholera in* 1853–4, *two-thirds would have escaped if their water-supply had been like their neighbours'*; and that, *of the much larger number—tenants of both companies—who died in* 1848–9, *also two-thirds would have escaped, if the Metropolis Water Act of* 1852 *had but been enacted a few years earlier.*

The above conclusions rest on so large a basis of facts, that I venture to believe they will be accepted as the final solution of any existing uncertainty as to the dangerousness of putrefiable drinking-water during visitations of epidemic cholera; and pathologists will probably admit that the definite proof of hurtfulness, thus established in respect of that one disease, may in principle be extended to the doctrine of other kindred affections.

To many it may appear that such proof needs not to have been sought; for that no reasonable person could ever seriously have doubted as to the hurtful tendency of the water lately distributed by the Southwark and Vauxhall Company. Such reliance on existing convictions would, however, have been misplaced. Not long ago, when there was last a public hearing of this company, its Directors declared the water to be "unexceptionably good;" its Chairman, contending that the works were capable of distributing from the Thames

at Battersea a supply "inferior in no appreciable degree to the "stream in any part of its course," remonstrated against any change of source as "a wholly uncalled-for expenditure of "capital;" and gentlemen of deserved eminence as chemists (though perhaps not entitled to speak with equal authority on the causation of disease) were found willing to express opinions both that this water, nourishing a population of animalcules, would "not be noxious" to health, and that "we "cannot in any part of the world connect the ravages of "cholera with the quality of the water" consumed.*

Even last year when our Committee for Scientific Inquiries had the honour of reporting on the materials then collected, we felt bound to express ourselves with some reserve;† not because our opinions were divided as to the probable danger of drinking such water as that in question; but because, from

* See Minutes of Evidence taken before the Select Committee on the Metropolis Water Bill, August 1851; Return to Inquiries of Metropolitan Sanitary Commissioners, 1850; and Remarks on the Water-Supply of London by Sir W. Clay, Bart., M.P., Chairman of the Grand Junction and Southwark and Vauxhall Companies, December 1849.—J.S.

† "We do, however, attach very great importance to the fact, that nearly all the waters consumed in London show a remarkable aptitude to develop low forms of animal and vegetable life; but this importance belongs, in our judgment, not to any direct influence exerted by such organisms on our own, but to the indications which their development affords that the waters wherein they grow are fraught with dead organic impurities.

"The admixture of *decomposing organic matter* in the water-supply of the Metropolis being attested equally by chemical analysis and by the microscopical evidence just adduced, we do not hesitate to speak of this contamination as one that may have exercised great influence on the spread of cholera among the population. The general history of this disease establishes its infinite preference for localities that are fœtid with organic impurity; and it is impossible to conceive either any specific chemical changes arising in the air of a district, or any morbid action excitable by it in the living body—such changes or such action being due to its contamination by dead organic admixture—without recognizing that the water of the district likewise—great solvent of air as it is—must, if similarly polluted, be liable to undergo the same alteration, and to originate the same effects, as the atmosphere around it.

"The present state of scientific knowledge does not justify dogmatic assertions on this subject; but there are reasons for believing, in respect not only of cholera, but of many kindred diseases, that the means and agencies of morbid infection stand in intimate relation to decaying animal products within and without the body; and the slightest taint of organic decomposition within the drinking-water of a large population therefore constitutes a danger which we cannot but regard with as much alarm as disgust."—*Report of the Committee for Scientific Inquiries;* pp. 47, 48.—J.S.

the absence of circumstantial proof, we were unable to speak of the danger as an evil demonstrated and measured.

Nor have later publications hitherto rendered our knowledge more precise. An interesting contribution has indeed been made in the results of a local inquiry, conducted with much care and ability by a Committee of the Vestry of St. James's, Westminster, into the circumstances of that remarkable outbreak of cholera which happened in the neighbourhood of Wardour Street* ; and the conclusion which that Committee reported was to the effect, that, in their unanimous opinion, "the sudden, severe, and concentrated outbreak "was in some manner attributable to the use of the impure "water of the well in Broad Street." While, however, it cannot be doubted that the evidence collected by that Committee strongly tends to justify their opinion, other and obvious facts give to the imputed operation at least an exceptional character. Bad as was the produce of the Broad Street well,—containing the results of organic decomposition filtered through but scanty thickness of surrounding soil—this quality of water was not peculiar to it. Generally through London, such must be the condition of superficial well-waters ; everywhere filtering from a dangerous proximity to cesspools and sewers; everywhere loaded with nitrates or ammonia; everywhere containing evidence that they represent the drainage of a great manure-bed ; and everywhere liable at any moment to contain excremental matter only imperfectly oxidised. In London no comprehensive inquiry could be made into the influence of these well-waters; but almost at the same time that the above investigations were in progress about Soho, others not less elaborate were proceeding at Munich, as part of a general inquiry under direction of the Bavarian Government. The circumstances of the two cases are so far similar, that the water-supply of that capital, as of London, is of various qualities—part brought from a distance, part derived from intramural wells which are liable in no common degree to the impreg-

* Report on the Cholera Outbreak in the Parish of St. James, Westminster, during the Autumn of 1854; presented to the Vestry by the Cholera Inquiry Committee, July 1855.—J.S.

nations just adverted to; yet in comparing the cholera mortality of populations thus differently supplied, the distinguished Professor who conducted the inquiry found himself unable to attribute to the well-waters any causative relation to the epidemic which had so severely prevailed in the town.*

But while, on the above showing, it must be conceded that for scientific purposes the definite information embodied in the following tables is of no superfluous kind, it may perhaps be objected that the practical application is less obvious, and that the inquiry has been instigated in a matter of past interest. For, since the epidemic of 1853–4, the Southwark and Vauxhall Company, in obedience to the Metropolis Water Act, has abandoned its former very objectionable source of supply, and for the last few months has been distributing a water, nearly or quite identical in quality with that here spoken of as furnished by the Lambeth Company.

This is, indeed, a very satisfactory fact; which, if the final purpose of the investigation had related only to persons suffering from that particular supply, would have superseded all necessity for the present Report.

But the question is of larger scope. Whether water can securely be drunk from rivers polluted by urban drainage, interests more or less every part of the country; and whatever facts can terminate this doubt, bear upon every plan for the water-supply of a population, and upon every plan for the drainage of a town.

Not even London can in this respect afford to consider itself safe against the danger which seems to have been removed from it. Lower than Teddington Lock, indeed, the Thames may not be used as a source of supply; but above that point there dwell beside the river or its tributaries very considerable urban populations; and hitherto the Legislature has not provided against any pollution of refuse which these communities may drain into the stream. At present, perhaps, the mischief is not great; the population is scattered; the

* Untersuchungen und Beobachtungen über die Verbreitungsart der Cholera; von Dr. Max Pettenkofer, München, 1855.—J.S.

drainage incomplete; the admixture, as compared with the volume of the river, almost insignificant. But whatever at this moment may be the amount of the evil, undoubtedly it tends day by day to increase; and that reform, which the Act of 1852 purported to accomplish, remains but imperfect and precarious while those river-side populations exercise a right of sewerage into the drinking-water of London.

It is, indeed, indispensable for the healthiness of towns, that house-drainage should be universally adopted, and that its currents should rapidly discharge themselves beyond the inhabited area. But the advantages thus to be gained will suffer a serious counterpoise, if they can be purchased only at the cost of making the sewage-outfall into rivers; if the change must be, from an unwholesome house to a polluted water-source; if that which would have been poison to inhale is to return as poison to drink.

Between these alternatives, it is greatly to be feared, lies the present choice of many considerable populations. Town drainage has been executed of late years, with too little recognition that its accomplishment, however successful, represents only part of a great problem. From it there results the production, as it were, of a novel commodity; valuable, if at the right time it can be at the right place, but otherwise valueless and baneful; for in default of that market which only good organization can create, the nearest water-course has to be fouled with what might enrich the fields. Even apart from such new pollution, it rarely happens that rivers are first-rate sources of supply: but they are often the easiest of application; and communities living along their course will generally overlook the worse quality for the sake of the cheaper price. Often therefore as town-drainage extends, successive populations adown the stream get worse and worse water to drink; till the evil at length attains those large and dangerous dimensions which, in respect of a single water-supply, it has been the object of this investigation to trace.

From the sanitary dilemma which these considerations suggest, the only possible escape seems to lie in the organization of means for the systematic agricultural employment of sewage. It is greatly to be hoped that the engineering genius

and commercial enterprise of the country may render such means available and lucrative for all urban populations. But, provisionally, it seems important to determine, whether convenient appliances exist for the so-called disinfection of sewage; and whether it would be expedient to enforce their adoption, as a restraint on the otherwise universal tendency towards draining putrefiable refuse into the drinking-waters of the country.

In conclusion, I beg to guard this Report against the misapprehension to which so fragmentary a scientific discussion is liable.

The inquiry has of necessity been restricted. It did not pretend to determine whether putrefiable drinking-water is a stronger or a weaker morbific influence than impure air or defective nourishment. Simply, it asked whether in certain large populations, breathing the same atmosphere, comprehending the same classes, and averaging the same habits of life, the fatal disease had been more prevalent among the drinkers of foul water than among the drinkers of clean water. The answer has been affirmative. The cholera-mortality of the former class was more than three-fold that of the latter.

The value of this result rests, of course, on the assumption that other influences of disease (whatever they may have been) were equal in the populations compared. For aught that appears to the contrary, it may be true that in every individual case of the 15,212 deaths inquired into, the sanitary arrangements of the house (apart from the quality of its water-supply) were defective. But this would not affect the argument of the Report: for there is no reason to suppose that such defects would be on the average unequally distributed between the two great totals of intermixed population respectively supplied by the two Companies: nor, especially, is it within the limits of reasonable supposition that throughout a continuous urban plan of seventy thousand houses, the removal of sanitary defects during five years should have been effected exclusively, as it were, on alternate houses and alternate streets, according to the accident of their water-supply. So, too, among the sufferers there may have

been a large proportion of poverty, with its attendant defects of nourishment; but this influence also must be supposed to have been impartially distributed between the tenantries of the two water-companies.

The present contribution therefore aims only at giving a more exact knowledge of one cause, not at gainsaying the existence of other causes. "The doctrine of epidemic cholera " which has gained almost universal acceptance, does not affect " to explain what may be that power—the exciting cause of " the epidemic manifestation—which at intervals of time has " forayed from place to place about our globe, sometimes " vaguely spreading over a widened area, sometimes seeming to " move in more defined procession, and which now for the third " time has shed its fatal influence on our land. But with this " mystery still unsolved, there has grown more and more into " shape a doctrine which is both intelligible and practical; " that the undiscovered power in its wanderings acts after the " manner of a *ferment*, that it therefore takes effect only amid " congenial circumstances, and that the stuff out of which it " brews poison must be air or water abounding with organic " impurity."* It is only to a part of the above doctrine that the preceding pages immediately refer: but to this part they give a new proof, and to the remainder an indirect confirmation. It entirely consists with the facts here set forth to maintain that, under the specific influence which determines an epidemic period, fecalised drinking-water and fecalised air equally may breed and convey the poison; and that this, whether in one vehicle or the other, may be expected to prevail most forcibly against the feeble and ill-nourished parts of a population.

I have the honour to be, Sir,
&c. &c.

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* Report of the Committee for Scientific Inquiries in relation to the Cholera Epidemic of 1853–4; p. 48.—J.S.

SANITARY STATE OF THE PEOPLE OF ENGLAND.

PAPERS RELATING TO THE SANITARY STATE OF THE PEOPLE OF ENGLAND.

Introductory Report, addressed (June 1858) to the Right Hon. the President of the General Board of Health, by the Medical Officer of the Board.

Sir,

I have the honour of laying before you a paper which exposes in a very remarkable manner the present wasteful expenditure of human life in England. Presentation of annexed paper.

It is the work of Dr. Greenhow, Lecturer on Public Health at St. Thomas's Hospital; who, having recently found it requisite for his own purposes, as a teacher of sanitary science, to analyse more minutely than had hitherto been done, the distribution of diseases among different parts of the community, has done me the favour of acquainting me with the results of his inquiry. And as these results appear to me of singular public interest with reference to sanitary administration, I have begged Dr. Greenhow to let me submit to you the paper in which he has embodied them.

It cannot be necessary that, with the paper here to speak for itself, I should attempt to offer you any complete analysis of its contents. But there are some of its conclusions which I would ask leave particularly to mention; partly because of their own very great interest; and partly because, in the new light which they afford, the sanitary state of the people of England almost imperatively claims to be reconsidered as a whole.

On this opportunity, therefore, I shall venture to submit to you my opinions as to the degree in which premature death can practically be prevented in England; and I shall refer to

that most valuable evidence which Dr. Greenhow's paper presents, as illustrating how very much remains to be done in great part of England before the limits of practical preventability will be even distantly approached.

Alleged excess of deaths in England.

It has now for some time been taught in the reports of the Registrar-General, that, of the entire annual mortality of England, at least a fourth part is of artificial production.

England is divided into 628 registration districts. Of these there are sixty-four (containing a population of about a million inhabitants) wherein the annual death-rate per 100,000 ranges from 1,500 to 1,700. But the average death-rate of England is about 2,266. Nearly nine-tenths of the registration tricts of England show death-rates which are in excess of 1,700, and which, in some notorious cases, run up to 3,100, 3,300, and 3,600.*

No one pretends that people live too long in the 64 districts first referred to. That life is artificially shortened in the other 564 districts, seems the necessary alternative.

At this point the general statistical argument requires to be re-inforced by the more detailed results of two other inquiries :—first, what does medical experience say as to the dependence on removable causes—in other words, as to the preventability, of certain diseases which contribute largely to

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* In the Registrar-General's last Quarterly Return (No. 36) it is well argued that, to account for this difference of effect, there must exist some difference of cause; and "whether the cause admit or do not admit of removal, the fact is "incontestable and must not be lost sight of, that the excess of deaths in England "and Wales over those from causes which exist in 64 districts was 91,856 "in the year 1857; for 420,019 persons died in that year [though its death-"rate was below the average] and about 328,163 persons would have died "had the mortality not exceeded the standard of 17 deaths in 1,000 living." It deserves notice that the mortality which most of all may be called premature—the mortality of young children—shows a still greater range of difference than the mortality of all ages. The death-rates of children in the first year of life were observed during the years 1838–44, to range per 1,000, in the *counties* of England from 118 in Westmorland to 237 in Lancashire; and in the *districts* of England from 77 in Glendale, Bellingham, and Haltwhistle to 296 in Aston-under-Lyne and Nottingham.—J.S.

the total mortality of England? and, secondly, what difference is there in the prevalence of these diseases in different districts of England?

It is the second of these questions which, to a great extent, Dr. Greenhow has answered. The value of his answer consists in its applicability to the purposes of local sanitary education and local sanitary improvement; an applicability, which cannot be otherwise tested and defined than by taking the two questions together, and considering the different local pressures of different diseases in connexion with the degree to which each disease admits of prevention.

Causes of death.

Natural death.

First, then, as to the preventability of certain diseases.—*Death by old age*, expressing the inevitable doom that our bodily material "wears out" as it lives, is the only mode of death which strict physiology counts *normal*. Each texture and organ of the body, when it has for a while existed in the gradually-attained ripe form in which it best fulfils its purpose, begins to decline from that form, and to fail in that purpose. Little by little, each characteristic structure withers, and each functional power is weakened. Sooner or later in this process, organs, essential to the mere vegetative life of the body as a whole, become incapable of further function; and the body as a whole is then dead.* Thus it is that death, unaccelerated by exterior influences, creeps at last on all men; the textural changes which mark its gradual approach are probably, in their kind, common to every living creature; and to undergo these changes in old age is as natural a part of human life as to have attained in succession youth and manhood. But the "old age" when they consummate themselves in death is not one precisely defined period for all alike. There are personal differences of longevity. Death, virtually by old age, comes to some men even before their sixtieth year. To most men it comes much later. A few complete their fifth vicennium: a few may carry well into it some of

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* "Causa autem periodi ea est; quod spiritus, instar flammæ lenis, perpetuo prædatorius, et cum hoc conspirans aër externus . . . tandem officinam corporis et machinas et organa perdat, et inhabilia reddat ad munus reparationis."—*Bacon, Hist. Vitæ et Mortis.*—J.S.

their best mental endowments. And apart, so far as is known, from any immediate dependence on exterior circumstances, these differences tend to repeat themselves in particular families. They are differences of stock.* But they are not operative to any great extent. And it cannot be far from the truth to assume that, if there were no artificial interference with the duration of life, death by natural decay would, in this country, under its present circumstances, usually happen at about 80 years of age.†

Premature death.

Now little more than a tenth part of the deaths of England happen at 75 years and upwards. And thus, physiologically speaking, one may say that at least nine-tenths of the entire mortality occurs more or less prematurely.

Unavoidable causes of premature death.

But this physiological statement must be guarded from misapplication. Theoretically, no doubt, every premature death may be regarded as in principle preventable; and that ideal standard is good to be borne in mind by persons who aspire to the highest sanitary results; but, in discussions which are for the immediate practical purposes of public and private hygiene, it has to be remembered that premature death could not be entirely absent from any given generation

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* Lord Bacon (loc cit.) noticed this fact, but noticed it with a qualification:—"illud vero experientia docet esse quasdam stirpes *ad tempus* longævas, ut longævitas "sit, quemadmodum morbi, res hæreditaria *in aliquibus periodis.*" The meaning of the qualification, expressed in the words which I italicise, seems to be this: that a long-lived type of man can be perpetuated only by the same sort of care (impossible on any large scale for the human subject) as is applied to perpetuate particular valuable qualities of farm stock; while similarly the short-lived type could only be changed by cross breeding.—J.S.

[In proportion as "old age" is normal, its processes of textural and functional obliteration seem to advance simultaneously and equally in all the different organs of the body. Hereditary peculiarities shew themselves in particular families in the tendency of particular organs to "die of old age" earlier than the other organs; and it seems probable that "premature old age" in particular organs is the essential meaning of a vast variety of those structural and functional failures with which men of shabby constitution (and particularly in certain families) die after comparatively short periods of mature life.—J.S., 1887.]

† In the Faroe islands, with a population of about 8,000, it appears that the period for death by old age is from the 80th to the 90th year; for, according to Dr. Panum, *many more deaths happen within that decennium of age than within any other decennium after the completion of the first year of life.*—Virchow's Archiv, I. 493.—J.S.

of the people, except on condition (first) that the generation had started with perfect innate healthiness, and (secondly) that thenceforth no extrinsic cause of death had been in operation against it,—conditions, which we but too well know our present generation could not hope to realise for itself. The function of the sanitary reformer is to reduce every reducible known cause of disease to its least possible degree of destructiveness: at every point he has to watch against too indolent an acquiescence in any existing evil: but, at least provisionally, he cannot refuse to recognize that a certain proportion of what science classifies as premature death is, in the world around him, not practically preventable.

Congenital and hereditary influence.

For instance, the certainty of premature death—a certainty quite irrespective of the immediate influence of exterior circumstances—is a *condition under which many are born.* Children come into the world, sometimes with malformations, which render healthy life impossible; sometimes with inherited disease or inherited morbid predisposition; sometimes with various ill-defined weaknesses of vitality, which render them unable to struggle onward, even for a single year, or dispose them more readily to sink under the ordinary trials of infancy. One family has become liable to gout and rheumatism; another to tubercular diseases; another to epilepsy and mania; another to this or that other form of visceral or humoral disease: and children born of these stocks have not the average expectation of healthy life. A certain share of every existing generation has in it from these sources the seeds of premature death. Such seeds may or may not be developed. In respect of many of the cases referred to, medicine has hitherto but imperfectly learnt the art of prevention. In respect of others (and fortunately this applies to the most fatal of the number) exterior circumstances can be shown to exert immense influence over the development of individual predisposition, and perhaps also exert some influence over the further propagation of that hereditary fault.

Unquestionably, however, deaths referred to under the present head are to a certain extent not preventable. And in order to determine whether the limits at which they become

preventable have in any particular case been exceeded, the following considerations furnish, I think, the safest argument for guidance:—(1) that the influence alleged to be non-preventable in the causation of these deaths is the personal or family predisposition; (2) that in any one country of moderate extent and mixed race, with a population exercising from part to part the freest intercourse and intermarriage and inter-migration, this influence would tend to be uniformly diffused; and (3) that, therefore, no natural reason can be conceived for its being in any one district of such a country much more powerful than in another district. So far, then, as personal predisposition accounts for the diseases in question, they would hardly be expected to vary much in their proportionate fatality in different districts of England. And any considerable exception to their uniform diffusion would suggest a very strong suspicion, that in the districts where they excessively prevail certain exciting causes must be specially and preventably in operation.

Contagions of small-pox, hooping-cough, measles, and scarlatina.

A further, in some degree unavoidable, cause of premature death in every civilized country is the risk of its *current contagions*. In Europe there are certain infectious complaints of which, once in life, nearly all persons are susceptible. The contagions of these diseases are never long absent from large communities; and a child during its first few years of life is almost of necessity exposed to them. Hence it is that, in European experience, the diseases in question—small-pox, hooping-cough, measles, and scarlatina—are so well known as diseases of childhood. To those who choose to avail themselves of Jenner's discovery, small-pox—the most fatal malady of this class—needs no longer be counted as a danger; but liability to the other infections is a more or less considerable risk which science hitherto cannot avert. Hooping-cough, measles, and scarlatina are, therefore, to a certain extent, inevitable causes of premature death. The severity with which any one of these diseases attacks an individual patient depends on his individual constitution; and often we are able to observe that corresponding differences of constitution (the sources of which are quite unknown to us) belong to several members of the same family. But, given a

certain severity of attack, the fatality of these diseases is greatly and evidently proportionate to exterior conditions. And the poor suffer from them immensely more than the rich, partly from possessing less ample means of treatment, but mainly because of the impure atmosphere which commonly surrounds the patient in his overcrowded and unventilated dwelling. In respect, then, of these diseases (as of those previously spoken of) it may fairly be supposed that their natural tendency is to prevail with equal severity or equal mildness in all districts of England; and any disproportionate fatality of these diseases in certain districts, as compared with their habitual fatality in other districts, is a fact which requires to be accounted for by the operation of local causes.

Practically, too, it must be reckoned that, even with the high civilisation of this country, and with its unequalled system of poor-law relief, *privation* still exists as a cause of premature death. Among the surgical cases treated at hospitals and dispensaries, diseases from insufficient nourishment form a very considerable part. Children especially suffer from this cause; and many of their so-called scrofulous ailments are in fact mere starvation-disorders, which a few weeks of better feeding can cure. And, besides the direct stint of food, and that indirect stint which consists in the use of damaged and adulterated provisions, there are other kinds of privation practically inseparable from poverty. It must have scanty house-room; and this—at least till the means of ventilating poor dwellings are thoroughly popularised—is an increased liability to disease. It must have scanty clothing and scanty fuel, and with little other protection than habit, must encounter inclemencies of weather. It must have a weight of care in its daily struggle for subsistence; it must have little of the variety and pleasurable excitement which are good for mind and body. Few tasks can be more difficult than to estimate the diffusion of poverty, as distinguished from pauperism, in different parts of England; and I have no means of determining whether poverty, in this sense, be one of the local conditions to which any preventable disease at all closely proportions itself. But, as regards pauperism, such certainly is not the case; a glance at Dr. Greenhow's table is

Privation.

sufficient to show that districts with the highest, and districts with the lowest, proportion of pauper-population do not stand opposedly to one another as regards general death-rate, or as regards the death-rates of particular diseases.

Accidental injuries.

Accidental injuries cannot be excluded from the busy life of a large community. Wounds, fractures and contusions, suffocation and drowning, must occasionally everywhere be causes of premature death. And personal carelessness, which contributes largely to produce these casualties, will also bear fruit in a certain number of other premature deaths—especially of deaths of young children by burns and scalds.

Violence, vice, and intemperance.

Criminal violence, too, will cut short some lives. And *vice* and *intemperance* will receive some of their retribution in the form of untimely death.

Extent to which premature death is unavoidable.

Congenital malformations and weaknesses, in their primary or in their secondary influence; hereditary dispositions to chronic and paroxymal disease of one kind and another; the infectious disorders of infancy and childhood; accidental and criminal injuries; privation in its various forms; intemperance and profligacy;—these are causes of premature death, which, it seems to me, must be provisionally accepted as, *to a certain extent*, inevitable. To a still further extent they must be accepted as only mitigable by degrees. And up to the extent of their inevitability, the death-rate of a population must rise beyond that which would prevail (1,250) if all men lived to their full term of fourscore years.

But what is the extent to which they are inevitable? Experience seems to have answered this question; not perfectly indeed; but with an approximation which, if wrong, is wrong adversely to exaggeration. There are populations which have habitual death-rates of 1,500, 1,600, and 1,700. A million of the inhabitants of England are living on those terms. In 64 registration districts scattered about the land, life is at that advantage.

Are those parts of England exempt, or comparatively exempt, from the morbid influences just recapitulated? There

is no shadow of reason for believing that such is the case. They suffer from all the influences in question to the extent to which those influences may fairly be considered inevitable. Deaths thus arising occur even too abundantly in the healthiest districts of England. They are included in the margin of 250, 350, and 450, which, in respect of such districts, raises the theoretical death-rate of 1,250 to 1,500, 1,600, and 1,700, respectively.

And at this point, as seems to me, the line of demarcation may reasonably and practically be drawn. If it appears (as it presently will appear) that the inevitable influences in question are in some districts of England greatly more fatal than in others, there will be strong primâ facie grounds for believing that the *local excesses of fatality are due to local circumstances of aggravation;* that *these aggravating local circumstances are such as it is fully possible to counteract;* and that *of the total mortality ascribed to these influences in England a very large share is preventable.*

This conclusion rises in importance in proportion as the diseases to which it relates are more and more frequent. It will presently be applied to those which of all are most fatal to our population; namely, first, to tubercular and other diseases of the lung; and, secondly, to the more special disorders of childhood.

Premature death by removable causes.

But a large share of the premature mortality of England depends on diseases respecting which it cannot be conceded that they (like those last discussed) are, to a certain extent, inevitable. On the contrary, *thousands of deaths annually result from diseases which are, in the most absolute sense, preventable;* diseases, which either will not arise, or will not spread, in communities which follow certain well-known sanitary laws. For, first, there are certain diseases of which it is hardly a metaphor to say, that they consist in the extension of a putrefactive process from matters outside the body to matters inside the body; diseases, of which the very essence is filth; diseases, which have no local habitation except where putrefiable air or putrefiable water furnishes means for their rise or propagation; diseases, against which there may be found a complete security in the culti-

vation of public and private cleanliness.* Yet some tens of thousands of deaths annually arise in England from these diseases. And again, there are diseases of other kinds, which annually kill some thousands more of our population, though the appointed preventives are so definite and so accessible that scarcely a death from such causes ought to occur in any civilised country.

To diseases entirely preventable, and to the preventable proportion of other diseases, is referred, by the allegation which I first quoted, at least a quarter of the mortality of England. And I beg now to bring under your notice some details in reference to both those classes of disease; as to their pressure in England generally; as to the distribution of that pressure in different parts of England; and as to the experience which has been obtained in the means of preventing their rise or reducing their fatality.

Diarrhœa. diseases.

1. *Cholera, diarrhœa* and *dysentery* have, during the nine years 1848–56, been fatal to 237,498 persons. If this number of deaths had been equally divided, the annual number would have been 26,388; but the distribution has been unequal. In the two years 1849 and 1854 there were 116,246 deaths; in the two years 1850 and 1855 there were but 29,425, or little more than a fourth part of the former amount. This inequality depends on the present tendency of diarrhœal diseases to prevail in certain years epidemically. A large proportion of the excess of deaths in 1849 and 1854 occurred during a few summer weeks, when the epidemic influence was at its height, and when it occasioned in various parts of the country a very alarming mortality.

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* "No city, so far as science may be trusted, can deserve immunity from epidemic disease, except by making absolute cleanliness the first law of its existence;—such cleanliness, I mean, as consists in the perfect adaptation of drainage, water-supply, scavenage, and ventilation, to the purposes they should respectively fulfil; such cleanliness as consists in carrying away by these means, inoffensively, all refuse materials of life—gaseous, solid, or fluid—from the person, the house, the factory, or the thoroughfare, so soon as possible after their formation, and with as near an approach as their several natures allow to one continuous current of removal."—*Reports on City of London.*—J.S.

Diarrhœal diseases, for two reasons, claim particular attention. In the first place, the registration-returns report them to be increasing in this country. During the years 1838–42 the deaths reported as due to them were only 13 per 1,000 of the deaths from all causes; during the years 1847–55 the proportion reported was five times as great. And, in the second place, their epidemic aggravations are sometimes of appalling severity. These things are almost forgotten when they are past; but probably, since the days of the great plague, death has never so scared an English population as in the cholera-epidemic of Newcastle in 1853, and in the Golden Square outbreak in 1854.

Dr. Greenhow's paper shows that these diseases have prevailed in different parts of the country with an astounding inequality. The average annual death-rate by cholera has ranged, from nothing and nearly nothing in some districts, to 357 and 365 and 403 in others. If cholera alone had shown this enormous range of difference, it might properly be questioned whether the history of two epidemics (for the figures are of course mainly derived from the death-lists of 1848–9 and 1853–4) is enough to justify generalisations in reference to the local affinities of a disease apparently so erratic and fitful in its attacks. Accidental influences might have counted for much in this restricted experience; and it might be expected that our next epidemic visitation would do something towards equalising the death-rates. No doubt this deserves consideration; most of all in those places which have hitherto escaped cholera apparently by no merits of their own. But cholera has not been alone in showing this great range. Local differences of death-rate scarcely less wide have been shown by those diarrhœal diseases which are always present among the population. Ordinary diarrhœa and dysentery have ranged in their joint average annual death-rate from under 10 in several districts, to 303 and 305 and 345 in others. Or if all diarrhœal diseases, epidemic and non-epidemic, be taken together (as Dr. Greenhow has taken them) under the single heading of "alvine flux," the average annual death-rate by this class of disease has ranged in

different districts, from 4, 8, 10, 14 and 17 in some, to 463, 493, 519, 568 and 663 in others.

It may be imagined that the lowest of these death-rates occurs under circumstances of exceptional healthiness which cannot generally be realized. So, instead of taking it for comparison (though I do not admit the objection), I will take *ten times its amount* as my standard. Let the importance of the subject be estimated from one simple statement:—If the diarrhœal death-rate of England generally were even *only ten times* the minimum diarrhœal death-rate, there would be an annual saving in England of nearly 20,000 lives.

Few things in medicine seem more certain than the general meaning of high diarrhœal death-rates. The mucous membrane of the intestinal canal is the excreting surface to which nature directs all the accidental putridities which enter us. Whether they have been breathed, or drunk, or eaten, or sucked up into the blood from the surfaces of foul sores, or directly injected into blood-vessels by the physiological experimenter, there it is that they settle and act. As wine "gets into the head," so these agents get into the bowels.* There, as their universal result, they tend to produce diarrhœa;—simple diarrhœa, in the absence of specific infections; specific diarrhœa, when the ferments of cholera and typhoid fever are in operation. And any such distribution of diarrhœal disease as has just been noticed warrants a presumption—indeed, so far as I know, a practical certainty, that, *in the districts which suffer the high diarrhœal death-rates, the population either breathes or drinks a large amount of putrefying animal refuse.*

A certain quantity of diarrhœa depends, no doubt, on other causes than putrefactive pollution of the system. Phthisis not rarely proves fatal by its effects on the intestinal canal; and probably a few of these phthisical deaths are registered under the name of the secondary disease. Temporary faults of diet very often occasion diarrhœa, though not often fatal diarrhœa. Habitually improper food (especially as regards infants and

* In some cases of putrid infection, perhaps most in those which are of slowest action, the tonsils and mucous membrane of the pharynx seem particularly to suffer.—J.S.

very young children) and various other personal influences contribute to the total of diarrhœal deaths. But causes which are merely personal would tend to operate evenly, or almost evenly, throughout the country. That their aggregate results are inconsiderable, may be inferred from the minimum figures quoted above; and the fullest allowance for them cannot materially affect the general conclusion which I have stated.

Cholera.

That conclusion might be supported by almost innumerable instances, both in reference to the occasional epidemic prevalence of cholera, and in reference to the habitual endemic prevalence of diarrhœa and dysentery. To the latter point I shall hereafter refer again in speaking of the death-rates of young children, who are probably the chief sufferers from endemic disorder of the bowels. And in reference to the epidemic disease, I trouble you with only two illustrations.

The first relates to the exemption of Tynemouth, in 1853, from an epidemic which prevailed in its neighbourhood. Newcastle and Gateshead suffered on that occasion the most terrible outbreak of cholera yet experienced in England, and lost within a few weeks nearly 2,000 of their population. In the borough of Tynemouth, only eight miles below Newcastle, and connected with it by railway as well as by river, there occurred during that epidemic period only four fatal indigenous cases. This escape was not due to an entire non-participation in the epidemic influence; for diarrhœa was generally prevalent in Tynemouth while cholera was in Newcastle. Nor did it depend on the absence of opportunities for contagion; for many thousand persons from Newcastle and Gateshead fled to Tynemouth, and many continued to pass daily between the towns during the whole time of the visitation. The remarkable immunity of Tynemouth is the more remarkable from its contrast with the heavy mortality experienced during the epidemic of 1848–9, when the deaths in the parish from cholera and diarrhœa amounted to 463.*

* The contingent expenses for the maintenance of widows and orphans whose claims arose out of that four month's visitation, appear to have amounted within the next four years to 7,500*l.* The cost (direct and indirect) of the epidemic at Newcastle and Gateshead, was estimated at about 40,000*l.* over and above the large losses sustained from the temporary stoppage of trade.—J.S.

The great difference between these results seems to have been entirely due to sanitary improvements effected in Tynemouth during the interval between the two visitations. Dr. Greenhow (who at that time was chairman of the Local Board, and took an active part in promoting its sanitary measures) has written the following account* of the course which was adopted :—

"The Public Health Act was applied to the Borough of Tynemouth, "on the petition of the Town Council, in the summer of 1851. The "provisions of the Act, relative to the registration and regulation of "common lodging-houses and slaughter-houses and the construction "of new streets and houses, were immediately put in force. Care "was taken to prevent the erection of houses without proper con- "veniences and provision for ventilation; no ash pits were allowed "to be made against the main walls of dwelling-houses or without "proper doors and covers; wherever sewers existed, drains from the "houses were insisted on; and all persons laying out new streets were "compelled to have back entrances to the houses, and to provide for "the construction of drains from the backs of the houses, instead "of carrying them underneath the basement story, as was previously "usual.

"In the autumn of 1852, when the re-appearance of cholera in this "country was considered probable, an active inspection of the town "was instituted by the Public Health Act Committee; the bye courts "and lanes were thoroughly cleansed; the gully grates trapped; the "foul open ditch behind the North-street was cleansed and filled in; "and many other local nuisances throughout the borough were "removed. On the report of the first death from cholera in New- "castle, in 1853, the like measures were again resorted to. The "courts, lanes, and common lodging-houses were inspected by the "health-committee, aided by other members of the town council. "Every common lodging-house in the town was peremptorily ordered "to be lime-washed and cleansed within 48 hours, an order which was "strictly obeyed. A large staff of carts and men were at once "employed to cleanse all the courts, lanes, and back passages in the "town, which, after the rough dirt was removed, were sluiced with "water thrown into them by a powerful fire-engine afloat on the "river. All the courts and smaller streets, after being thus perfectly "cleansed, were lime-washed. Depôts of quicklime for the use of the "poor were placed in convenient places throughout the borough, at "the expense of the Board of Health: and to induce them to make "free use of it, the local authorities personally visited the inhabitants "of the localities in which cholera had formerly prevailed. Ruinous

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* Cholera in Tynemouth in 1831–32, 1848–49, and 1853. By E. Headlam Greenhow, M.D., read before the Epidemiological Society of London, February 5, 1855.—J.S.

" channels were repaired; and where the gullies were imperfectly trapped
" this was rectified, and chloride of lime, of which a ton was speedily
" consumed, was profusely used for the purpose of disinfecting them.
" In the course of 14 days the town was brought into as good a sani-
" tary state as possible under existing circumstances, 1,500 cartloads of
" manure having been removed in that short period from the vicinity
" of human habitations. The entire expense incurred by these
" operations amounted to 230*l.*, which was afterwards reduced to less
" than 200*l.* by the sale of the manure."

The second case relates to the distribution of cholera-deaths during two epidemics in the southern districts of London. These districts (comprising nearly a fifth of the entire population of the metropolis) have been notorious for the great severity with which cholera has visited them on each occasion of its epidemic prevalence in England. During the last invasion these districts were accidentally the seat of a gigantic sanitary experiment; and a difference in one sanitary condition was seen to influence most remarkably the distribution of the cholera-mortality. For throughout those districts, during the epidemic of 1853–4, there were distributed, by two rival water-companies, two different qualities of water; so that one large population was drinking a tolerably good water, another large population an exceedingly foul water; while in all other respects these two populations, being intermixed in the same districts, and even in the same streets of these districts, were living under precisely similar social and sanitary circumstances. And when, at the end of the epidemic period, the death-rates of these populations were compared, it was found that the cholera-mortality, in the houses supplied by the bad water, had been 3½ times as great as in the houses supplied by the better water. This proof of the fatal influence of foul water was rendered still stronger by reference to what had occurred in the same districts in the epidemic of 1848–9. For on that occasion, the experiment on the two populations had been tried in a reverse way. The company which during the later epidemic gave the better water, had given during the earlier epidemic even a worse water than its rival's; and the population supplied by it had at that time suffered a proportionately

worse cholera-mortality. So that the consequence of the improvement made by the one water-company, in the interval between the two epidemics was, that, whereas in the epidemic of 1848–9 there had died 1,925 of their tenants, there died in the epidemic of 1853–4 only 611; while among the tenants of the rival company (whose supply between the two epidemics had become worse instead of better) the deaths, which in 1848–9 had been 2,880, were in 1853–4 increased to 3,476.* And when these numbers are made proportionate to the populations or tenantries concerned in the two periods respectively, it is found that the cholera death-rates per 10,000 tenants of the companies were about as follows :—for *those who in* 1848–9 *drunk the worse water,* 125; for *their neighbours, who in the same epidemic drank a water somewhat less impure,* 118; for *those who in* 1853–4 *drank the worst water which had been supplied,* 130; for *those who in this epidemic drank a comparatively clean water,* 37. The quality of water which (as is illustrated in the first three of these numbers) has produced such fatal results in the metropolis, causing two-thirds of the cholera-deaths in those parts of London which have most severely suffered from the disease, has been river-water polluted by town-drainage; water, pumped from the Thames within range of the sewage of London; water which, according to the concurrent testimony of chemical and microscopical observers, was abundantly charged with matters in course of putrefactive change.†

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* Since the epidemic of 1854, this company has had recourse to purer sources of supply.—J.S.

† *See* "Report on the Influence of Impure Water in the last Two Epidemics of Cholera," 1855. When I inquired, with Mr. Hume and Mr. Bateman, into the causes of the severe epidemic of cholera at Newcastle and Gateshead, such evidence as we could collect on the influence of the water-supply (which had been partly pumped from the Tyne) did not justify us in saying more than that "the water was such as ought never to have been distributed, and that on "the most favourable view we can adopt, it must be regarded with grave sus-"picion in relation to its influence on the late outbreak." In many instances, there has been reason to believe that some of the most destructive outbreaks which have occurred in particular groups of houses have depended on the use of well-water, into which impurities had either been carelessly thrown or had drained or leaked through the adjoining soil. Numerous highly instructive

2. Under the Registrar-General's head of *Typhus* (which does not include infantile fever or remittent fever) there were recorded during the nine years 1848–56 as many as 156,340 deaths; being at the rate of 17,371 deaths per annum. Fever.

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illustrations, both to this effect, and generally as to the influence of polluted water, have been collected by Dr. Snow in various writings from 1849 to the present time; especially in his work "On the Mode of Communication of Cholera," 1855. The facts have been brought together by Dr. Snow, with a view to illustrate his peculiar doctrine (first advanced in 1849) as to the contagiousness of cholera. This doctrine is, that cholera propagates itself by a "morbid matter," which, passing from one patient in his evacuations, is accidentally swallowed by other persons as a pollution of food or water; that an increase of the swallowed germ of disease takes place in the interior of the stomach and bowels, giving rise to the essential actions of cholera, as at first a local derangement; and that the "morbid matter of cholera having "the property of reproducing its own kind, must necessarily have some "sort of structure, most likely that of a cell." .... Whatever may be the worth of the theory, it has been of use in contributing to draw attention to the vast hygienic importance of a pure water-supply; and Dr. Snow's most zealous labours in collecting evidence on this subject deserve grateful acknowledgment from every one who is interested in the subject. Some interesting and important experiments, made in 1854 by Professor Thiersch, of Erlangen, seemed to show that cholera evacuations *in the course of their decomposition* acquire contagious property.... According to the observations of Professor Pettenkofer at Munich and Professor Acland at Oxford, it would seem that during cholera-periods the immigration of persons suffering diarrhœa has been followed by outbreaks of cholera in places previously uninfected; and Professor Pettenkofer ascribes this fact to an infective influence exerted by the fæces of such persons in the cesspools and adjoining soil of ill-conditioned places to which they go. An infection of this kind would probably extend itself to the polluted well-waters of such soils, and might render them, if swallowed, capable of exciting cholera by direct contagion. It is encouraging to sanitary reformers, to observe that cases of apparent introduction of cholera-contagion by human intercourse are essentially different from such cases of infection as are presented by measles or small-pox. The multiplication of poison in the latter diseases takes place exclusively within the human body; it has no immediate dependence on differences of medium; and wherever human beings can cross one another's path, the susceptible person may contract infection.... For diffusing the contagion of cholera, if truly the disease be contagious, foulness of medium seems indispensable. Indeed, it is no ordinary foulness which taints air or food or water with the leaven of decaying excrement. Therefore, as regards cholera, it seems highly probable that the immigration of infected persons might occur to any extent without exciting epidemic outbreaks, if it occurred only into places of irreproachable sanitary conditions, especially as regards the supply of water, and the continuous removal of house-refuse. Compare Pettenkofer über die Verbreitungsart der Cholera, 1854; Acland on the Cholera at Oxford, 1856; and Thiersch's Infections-versuche an Thieren mit dem Inhalte des Cholera-darmes, 1856.—J.S.

The common judgment of the medical profession on the controllability of continued fever is well expressed in a phrase which the late M. Baudens, an eminent physician of the French army, used in describing his Crimean experience of the disease:—*On pourrait le faire naître et mourir à volonté.*

It is essentially a disease of filth. Where the unventilated atmosphere of habitually overcrowded places reeks with a stagnant steam from the breathing and sweating of its inhabitants—a steam which condenses in fœtid drops on the window panes, or soaks and rots in the papered or plastered walls; or where putrefying fæces are accumulated in cesspools or ill-conditioned drains, to taint the air or leak into the drinking water of a population; there "fever" tends to prevail in one or other of its forms.

In one or other of its forms, I say;—for the researches of modern pathologists have shown that for accuracy's sake it is requisite to distinguish at least two forms of continued fever.* And it seems highly probable that these forms, while both equally associated with filth, are yet not both essentially associated with the same kind of filth. One of them (the *typhoid fever* of modern observers) has intimate affinity to the cause last mentioned—the fæcal pollution of air and water. The other (which is now distinctively called *typhus*) more nearly associates itself with overcrowding, especially of destitute persons, and probably has its essential source in the putrefaction of their undispersed exhalations. The typhoid form, specially affecting the intestinal canal, is, in its nature as in its causes, very closely related to the diarrhœal diseases already spoken of. There exists no conclusive evidence to show whether this form of disease be in any degree or any

* While writing, I observe that a paper, including original observations apparently of much importance on the subject of continued fever, has just been communicated to the Royal Medical and Chirurgical Society by Dr. Murchison. In respect of the distinction between the typhus and typhoid forms, this paper (so far as may be judged from the abstract of it published in the British Medical Journal of June 12th) strongly supports the opinion expressed in 1849 by Dr. William Jenner, in his classical essay on the subject, that "the specific cause "of typhus and typhoid fevers are absolutely different from each other."—J.S.

manner contagious; but almost certainly it cannot spread atmospherically by means of exhalations from the sick. Distinctive typhus, on the other hand, works its chief results without affecting the bowels. Possibly its first and greatest influence is exerted on the blood, but its symptoms are chiefly obvious in the nervous system, the skin and the lungs; and the exhalations from a patient undergoing it are, till they have been neutralised by dilution with pure air, capable of communicating the same form of disease. It has some hitherto unexplained connexion with extremes of poverty and destitution. No such ravages have been made by it as when it has been associated with famine, and—apparently by reason of this association—has prevailed as a national epidemic.*

A knowledge of the distinction between these two forms of disease has hitherto not become general enough in England for the name of typhoid fever to have been kept separate in the registration-returns. Though probably much more fatal in ordinary years than the true typhus, with which it is confounded, it has hitherto no statistical existence. I have therefore no choice but to speak of continued fever as though it were but a single form of disease, communicable from person to person.†

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* It would be mere speculation in the present state of knowledge to dwell on certain analogies which exist between the state of persons dwelling in foul atmospheres and the state of persons suffering starvation. It may suffice to observe, that they probably have in common a defective defecation of the system. The starved body, which cannot renew the waste of its texture by the ordinary resources of food, may be conceived as eking itself out, and maintaining the continuity of its organs, by stuff which under ordinary circumstances of nutrition would have been discharged as effete. It would thus come to consist to an abnormal extent of stale material in a state verging on dissolution. And just as the rags of poverty may by a touch be torn asunder, so the half-starved tissues which they cover fall under very small injuries into disproportionate ulceration and gangrene. The fact that during times of famine masses of population are found with their textures and juices in this state (undefecated because unrenewed) may perhaps have something to do with their fatal susceptibility to typhus; for, under such circumstances, the contagion of this form of disease will spread and multiply (like the contagion of small-pox amid an unprotected population) at a rate quite disproportionate to the sanitary defects of localities.—J. S.

† Dr. William Jenner, who has contributed so importantly to the separation of the two forms of disease, observes: "With respect to the contagious nature

Among the 105 registration-districts into which Dr. Greenhow has inquired, there is none but has suffered deaths from fever. The death-rate from this cause has ranged from 21 in one district, 33 in a second, and under 50 in five others, to 204, 207, and 209. The fact of a few deaths from fever cannot be accepted as conclusive proof of sanitary neglect in the district where they have occurred; for unavoidable contagion may have been imported—even the fatal cases themselves may have come—from the fever-nest of some adjoining jurisdiction. But I do not hesitate to say that the registration of any fever-deaths in a district not suffering from famine is a thing which, for the credit of the local sanitary authority, ought to be susceptible of some such explanation. And as the death-rate rises from a minimum of 21, which is itself an excess, to a maximum of 209, which is ten times that excess, the chance of finding exculpatory circumstances is diminished at every step. Perhaps even

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" of typhus fever, I know no one who entertains a doubt. If typhoid fever be " contagious, it is infinitely less so than typhus fever." That the experience of the London Fever Hospital (in days when that distinction of forms was not yet drawn) was conclusive as to the infectiousness of "fever" is shown by Dr. Tweedie in the following sentences. "Every physician, with one exception " (the late Dr. Bateman) who has been connected with the Fever Hospital " has been attacked with fever during his attendance, and three out of eight " physicians have died. The resident medical officers, matrons, porters, " domestic servants and nurses have one and all invariably been the subject " of fever; and the laundresses, whose duty it is to wash the patients' clothes, " are so invariably and frequently attacked, that few women will undertake this " duty. The resident medical officer was attacked with fever, and it became " necessary to appoint some one to perform his duties. The first person who " thus officiated took the precaution of sleeping at home, yet his duties were " soon interrupted by an attack of fever, which confined him a considerable " time. He was succeeded by an individual in robust health, a disbeliever in " the doctrine of contagion. He performed his duty only ten days, when " symptoms of severe fever appeared. There is no security in this narrative, " striking as it is, against the favourite argument of the non-contagionists; but " the following collateral circumstances present an obstacle to the intrusion of " malaria, which only bigotry or the spirit of partizanship can enable it to " surmount. The Fever Hospital stands in the centre of a large field, where the " production of malaria is exceedingly improbable; and on the same lawn, and " within a few yards of it, stands the Small-pox Hospital; but no case of " genuine fever has occurred among the medical officers or domestics of that " institution for the last eight years." — *Cyclopædia Pract. Med., Art. Contagion.*—J.S.

in the districts which have suffered least from fever such circumstances could not commonly be shown to have prevailed: but infinitely less is the probability of excuse, and infinitely greater is the presumption of gross sanitary neglect, in those districts which have suffered tenfold the minimum fatality.

The undoubted contagiousness of one form of fever may, as I have said, be a partial exculpation of districts where deaths from typhus have been registered; but even this, only at the expense of other districts whence the contagion has come, and without any lessening of the national responsibility for the quantity of preventable death. And where many fever-deaths have been registered, the exculpation cannot be more than partial. Quite exceptionally, a well-ordered household may receive the fatal contagion from some filthy hovel which has bred it. But generally speaking the contagion has little tendency to multiply itself, except where the same conditions exist as those under which it began. Oftenest of all, therefore, it is from hovel to hovel, from crowded lodging-house to crowded lodging-house, that the infection of fever spreads. Whether it be commonly requisite for the origination of fever in these filthy places that the specific contagion should each time be re-introduced from without, is a theoretical question on which the medical profession is not unanimous; but the practical lesson, respecting which there is no difference of opinion, is admirably taught by the most eminent medical teacher* of the present generation, as "the unquestionable fact that fever "is fostered and spread through those impurities which "sanitary measures are intended to banish . . . The specific "exciting cause of continued fever cannot, perhaps, be utterly "expelled or precluded; but when present in a community "it may be rendered comparatively harmless by taking away "the main conditions of its morbiferous efficacy and of its "faculty of propagation."

Every collection of medical experience teems with instances to illustrate what are those "main conditions" on which the

* Dr. Watson in his *Lectures on the Practice of Physic.* Fourth edition, vol. ii., p. 835.—J.S.

fatality of fever depends. Such instances are of every degree of magnitude, but in substance they all agree. The experience of common lodging-houses,* the experience of single courts in a town,† the experience of hospitals and workhouses,‡ the

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* *See* Assistant-Commissioner Harris's Report on the Operation of the Common Lodging-houses Acts, 1857; and an illustration given by Dr. Wyld in the Transact. of the Social Science Association, p. 482.—J.S.

See Dr. Southwood Smith's Report to the Poor Law Commissioners in 1838; a paper which especially deserves to be referred to, because the commencement of State-interference on behalf of the health of the labouring classes may be said to date from its publication, and to have been in a very important degree determined by its facts and arguments. *See* also Report (with evidence) of Commissioners for inquiring into the State of Large Towns and Populous Districts.—J.S.

‡ *See* Sir Gilbert Blane on the Prevalence of different Diseases in London, and Miss Nightingale's Evidence before the Commissioners appointed to inquire into the Regulations affecting the Sanitary Condition of the Army. Last century's familiar fever, in its epidemic form, was "the hospital-fever" as well as the "gaol-fever." Sir Gilbert Blane mentions that in 1783, when he was elected physician of St. Thomas's Hospital, "febrile infection prevailed there so "much that his two immediate predecessors, and one of the surgeons, besides "several of the menial attendants, had died in the course of the preceding year "of fever caught in the hospital; upon which the number of patients was "reduced, and new methods of cleanliness and ventilation were adopted. All "the wards (he continues) have ever since been annually whitewashed; the "strictest attention has been paid to the cleanliness of bed and body clothes, "washing, sweeping, and all other means of removing offensive matter." As I happen to have been long connected with St. Thomas's Hospital, I may mention that, in five and twenty years, during which I have been intimately acquainted with its working under those improved arrangements, I have not known of any physician or surgeon or apothecary contracting fever, and but rarely have heard of the disease extending to a nurse or sister in constant attendance on the sick. During the Crimean campaign there was a time when in the Scutari hospitals, "typhus attacked both sick and well. . . Also there "were frequent relapses of fever . . . and the wounded having come in for "wounds, frequently died from fever." The lady who made her beneficient home in those dreadful scenes, and who has laboured her utmost to render their recurrence impossible, describes the circumstances of the sufferers:—"The "space for each patient was one fourth of what it ought to have been. . . . It is "impossible to describe the state of the atmosphere in the barrack hospital at "night. I have been well acquainted with the dwellings of the worst parts of "most of the great cities in Europe, but never have been in an atmosphere "which I could compare with it. . . . . The sewer gases blow into the wards "and corridors. A change of wind so as to blow up the open mouths of the "drains was, therefore, not unfrequently marked by outbreaks of fever among "the patients. . . . . The drinking water was not free from organic matter; "on one occasion the dirty hospital dresses have been seen in the tank which "supplied water. . . . . A dead horse also lay for some weeks in the aqueduct."

experience of barracks,* the experience of the navy,† the

It needs not be said that fever was only one of many murderous diseases which prevailed under those circumstances. And when the causes of "hospital fever" were extinguished, hospital gangrene and cholera and diarrhœa went as the fever went; for the hospitals were at last brought to a sanitary condition, in which Miss Nightingale could say of them, "I know of no buildings in the world I "could compare with them, the original defect of construction of course ex- "cepted."—*Evidence*, especially 9,998, 10,006, 10,014.—J.S.

* Dr. Balfour, the Secretary of the Army Sanitary Commission, furnished for the report a memorandum on the health of the Guards stationed in the Tower of London during the fifteen years 1839–54; dividing this period into three stages, as it were, of sanitary experiment. 1st, from April 1839 to September 1843, the troops were exposed to emanations from the tidal ditch into which the drains of the tower emptied their contents; 2ndly, from October 1843 to September 1849, the ditch had been dried, but the troops were still quartered in old, badly-constructed barracks, and were supplied with water from the river; 3rdly, from October 1849 till February 1854, the men occupied the new barrack, and were furnished with water of excellent quality for cooking and drinking. Concurrently with these changes the rate of admission into hospital on account of continued fever and typhus declined from 107·11 in the first period to 93·73 in the second and 59·11 in the third; while the death-rate from the same diseases diminished from 4·79 in the first period to 3·06 in the second and 2·97 in the third. During the five successive years, 1843–7, M. Boudin observed at the Military Hospital at Versailles, that about the month of October there was a very fatal epidemic of typhoid fever, consisting exclusively of cases admitted from the garrison of St. Cloud. This epidemic began a week after the king's arrival, and disappeared directly after his departure; it never affected either the civil population of St. Cloud, or the officers, or even the *sous-officiers*, though the latter inhabited the same barrack as the corporals and soldiers. M. Boudin's inquiry gave him the following solution of the case:—The garrison of St. Cloud at its ordinary strength of four to five hundred men enjoyed good health; but when, on the king's arrival, its strength was raised to twelve hundred—and this number was packed into narrow unventilated spaces—the fever broke out. The sous-officiers, beside being better fed and less worked, had always at least one room for each two of their number.—J.S.

† *See* Lind's "Essay on the most effectual Means of Preserving the Health "of Seamen in the Royal Navy, 1757," and Sir Gilbert Blane "On the Com- "parative Health of the Navy" during the fifty years 1779–1829. As late as 1780, Haslar Hospital received from the channel fleet, 5,539 cases of fever in the year. But not fifty years afterwards the Vice-Admiral of England (Lord de Saumarez, who died at an advanced age in 1836) was able to say, that within his recollection the efficiency of the navy had been doubled by improvements in its health. For (says Sir G. Blane) while "scurvy had been extirpated" by that general introduction of lemon juice, which marks the year 1796 as "an era "in the history of the health of the navy, fever also had been greatly subdued.. "by improvements in the method of promoting ventilation and cleanliness, and "particularly by the strict discipline adopted and enforced in the channel fleet; "fever, of which the 'ascertained cause' had been 'air contaminated by foul "and stagnant exhalations, particularly those from the living body;' fever, "which had 'been a more grievous and general source of mortality in the navy

experience of prisons,*—all are to the same effect. Every history of the worst prevalence of fever, when it has existed independently of famine, has connected its ravages with overcrowding and filth.

Not a century has passed since it was distinctively the disease of prisons. It was the *gaol fever* of our great John Howard, who well knew the sanitary circumstances which develop it. And no better illustration can be had of those circumstances—no better illustration of the control which society possesses over them—than is afforded by turning from the prisons of the present day, wherein epidemic fever is an unknown disease, to the prisons of the last generation.

It was in 1777 that Howard—dedicating his work to the House of Commons "in gratitude for the encouragement " which they had given to the design," drew attention to various forms of cruelty in the then prevailing system of prison discipline, and specially alleged that prison-life, such as it then was, engendered diseases by which "many who " went in healthy are in a few months changed to emaciated " dejected objects." He described the atmosphere of prisons:—"My reader (he says) will judge of its malignity when " I assure him that my clothes were in my first journeys " so offensive that in a postchaise I could not bear the " windows drawn up, and was therefore obliged to travel " commonly on horseback. The leaves of my memorandum " book were often so tainted that I could not use it till after " spreading it an hour or two before the fire; and even my " antidote, a vial of vinegar, has, after using it in a few " prisons, become intolerably disagreeable. I did not wonder " that in those journeys many gaolers made excuses, and did

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" than even the scurvy, being more difficult to deal with both in point of preven- " tion and cure.'" The kind of atmosphere may be inferred from Dr. Lind's statement:—"I have known a thousand [imprest] men confined together in " one guardship, some hundreds of whom had neither a bed, nor so much as " a change of linen. I have seen many of these brought into Haslar Hospital " in the same clothes and shirts they had on when pressed several months " before."—J.S.

* In contrast to the quotations from Howard in the text, see, as regards our own times, the Reports of the Inspectors of Prisons, and the Essay of Dr. Baly on the Mortality in Prisons.—J.S.

" not go with me into the felons' wards..... Any one may " judge of the probability there is against the health " and life of prisoners crowded in close rooms, cells, and " subterraneous dungeons for fourteen or fifteen hours out of " the four-and-twenty. In some of these caverns the floor " is very damp; in others there is sometimes an inch or two " of water, and the straw or bedding is laid on such floors, " seldom on barrack bedsteads..... Some gaols have no " sewers or vaults, and in those that have, if they be not " properly attended to, they are, even to a visitant, offensive " beyond expression.... In some prisons the window tax, " which the gaolers have to pay, tempts them to stop " the windows and stifle the prisoners. In many gaols, and " in most bridewells, there is no allowance of bedding or " straw for prisoners to sleep on; and if by any means " they get a little it is not changed for months together, " so that it is offensive and almost worn to dust. Some " lie upon rags, others upon the bare floors." He then spoke of the necessary consequence of this life:—" I am ready to " think that none who give credit to what is contained in " the foregoing pages will wonder at the havoc made by the " gaol fever. From my own observations in 1773, 1774, and " 1775, I was fully convinced that many more prisoners " were destroyed by it than were put to death by all the " public executions in the kingdom. This frequent effect " of confinement in prison seems generally understood, and " shows how full of emphatical meaning is the curse of a " severe creditor, who pronounces his debtor's doom to *rot in* " *gaol.* I believe I have learned the full import of this " sentence from the vast numbers who, to my certain know- " ledge, and some of them before my eyes, have perished " by the gaol fever."

It is almost unnecessary to say that the state of things which Howard described has not been witnessed in the prisons in England by any one of the present generation. The keeping of criminals has been amended with due regard to sanitary requirements; and now, if even a single felon were known to die in England under circumstances which 85 years ago were the rule and habit of prison life, the whole

strength of public opinion would express itself as against a murder. Yet, outside that privileged area, fever continues its ravages. It continues them under circumstances which —except for the mere bars and bolts of the prison-house— are identical with those which Howard described. And if his language seems familiar to the eye, it is not because his work has of late years often been consciously quoted. It is because the same close dark cells, the same damp floor, the same fœtid atmosphere, have had to be again and again described by officers of health and parochial medical officers; no longer indeed as the scandals of prison discipline, but as constituting the too frequent household circumstances of the poor.

Chiefly from among our labouring population, fever takes its annual seventeen or eighteen thousand victims. And besides the thousands whom it kills, there are many times the number whom it prostrates for weeks and months, and whom, with their families, it impoverishes or perhaps ruins and pauperises.

Howard closed his memorable appeal by suggesting that "even if no mercy were due to prisoners, the gaol distemper "is a national concern of no small importance." Its claims to this rank of importance are surely not yet at an end, while its causes remain virulent in the homes of our working population, while its cruel contagion is maintained at their cost, and while so many thousand lives are yearly sacrificed to the negligence which lets it continue.

Pulmonary affections.

3. *Pulmonary affections*, including phthisis, cause very nearly a quarter of the annual mortality of England. Every 100,000 of our population yields on an average 552 annual victims to this deadly class of disorder.

This death-rate is far from being uniform throughout the country. In the northern division of England the death-rate is only 463; in the adjoining north-western division it is 683; in Cumberland and Herefordshire it is 435; in Lancashire it is 706. Still wider is the range of difference in the district death-rates. They vary from 216, 242, and 304 to 851, 859, and 999.

In order to recognize the local conditions which determine these differences of death-rate, it is requisite to distinguish three principal forms of pulmonary affection.

a. First, there is *pulmonary phthisis,* which kills on an average in England more than 50,000 persons a year. And beside these who die under the pulmonary form of tubercular disease, 8,000 more are annually registered as dying of *scrofula* and *tabes mesenterica.* And under the same constitutional tendency, manifested in still other forms of local disease, there must remain other thousands to count. Phthisis.

Phthisis, therefore, deserves especial study; not only because of the 50,000 deaths which it annually causes; but because it is the type of a great family of diseases, whereof the other members are hitherto less perfectly registered than it; and because, in observing the local distribution of deaths by phthisis, we can toleraby well estimate the distribution of many thousands of other deaths. (Scrofula.)

There is a further reason, for which the mortality by phthisis ought to be very jealously criticised; a reason, for which its local differences of pressure deserve quite peculiarly to be regarded as a matter of national concern. The tendency to tubercular disease is one which transmits itself from parent to child; and thus, if in any one generation the disease be artificially engendered or increased, that misfortune does not confine its consequences to the generation which first suffers them. *Whatever tends to increase tubercular disease among the adult members of a population must be regarded as assuredly tending to produce a progressive degeneration of race.*

In proceeding to criticise the range of death-rate by tubercular phthisis, I must observe that the nature of the disease exempts its death-rate from many sources of fallacy to which the local statistics of some other diseases are subject. Phthisis is chronic, non-infectious, non-epidemic: in districts of some size it is not likely to vary much from year to year; and a septennial average of its district-pressure must almost of necessity give a true representation of what it professes to represent. But as phthisis principally affects the ages subsequent to puberty, statistical results are perhaps most

trustworthy when they are calculated for ages over 20. And because certain diseases which may be wrongly confounded with true phthisis are much more frequent in the men than in the women of the districts which suffer them, the female death-rate is a surer test than the male. Accordingly the most decisive figures for measuring differences of local death-rate by phthisis are those which relate to the female population, and especially to the female population at ages above puberty.

District death-rates by phthisis generally (without distinction of sex or age) range from 134, 144, 165, 173 and 183 to 390, 407, 409, 421 and 445. The female death-rate by phthisis ranges from 156 to 517. The adult female death-rate by phthisis ranges from 229 to 588.

These figures bear unequivocal testimony to the operation of local causes in the production of tubercular disease. The most important among such local causes is shown by Dr. Greenhow to consist in the industrial relations of the people. The great contrasts are found to lie between populations, respectively agricultural and manufacturing. *In proportion as the male and female populations are severally attracted to in-door branches of industry, in such proportion, other things being equal, their respective death-rates by phthisis are increased.*

This fact associates itself with a very important result, which was well developed a few years ago by Dr. Baly in his admirable essay on the mortality in prisons. From examination of the medical records of the Milbank Penitentiary, he had learnt, "that the mortality caused by tubercular "disease had been between three and four times as great "during the eighteen years, 1825–42, among the convicts "confined in this prison as it was in the year 1842 among "persons of the same period of life in London generally; and "that three-fourths of the excess of deaths from all causes "in the Penitentiary above the rate of mortality of all persons "in the metropolis of the same period of life had been due to "the prevalence of that disease." Comparing the large number of prisoners in whom tubercular disease of the lungs first showed itself while they were in the Penitentiary with

the small number who were affected with it at the time of their reception, he was convinced "that imprisonment exerted "here a very powerful influence in causing the development "of the disease." Extending his inquiry to the other prisons of England, and to the prisons of other states in Europe and America, he found that the influence was one of universal operation, and learnt (as might have been expected) that other forms of scrofula were developed in the same proportion as pulmonary phthisis; that not merely this one form of the infliction, but tubercular disease in all its forms, resulted from the long-continued influence of imprisonment on the bodily health. This influence appears to be partly physical and partly moral:—among its component parts (with cold and poorness of diet) Dr. Baly enumerates deficient ventilation, sedentary occupations, and want of active bodily exercise, and a listless or dejected state of mind.*

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* Of the points referred to by Dr. Baly, there are some in which the life of a textile population, especially of a textile-factory population, is comparable to the life of prisoners. At its best it has to a great extent the evils of monotony, of deficient bodily exercise, of physical seclusion from sun and air, and of mental privation from what is beautiful and animating in external nature. And thus probably, even at its best, it tends to produce some amount of vital depression, some kind of mental and bodily etiolation during which (especially in the case of persons otherwise predisposed to scrofula) there is a heightened liability to tubercular disease. Under an abuse of the factory system, these evils may be infinitely developed, in proportion to fewness of holidays and length of daily work time; most of all, no doubt, where the overtasked population does its work in ill ventilated places. The Saturday half-holiday, if it becomes general, is likely to be of considerable importance in mitigating the evils referred to. And generally speaking, it may be said that employers who take an interest in promoting the recreation of their workpeople, especially by out-door exercise or the pursuit of natural history, are great sanitary benefactors. The number of such men is now not inconsiderable; and the relations between capital and labour are, I believe, every year becoming more merciful. From a most interesting paper (*On the relations betwixt Employer and Employed under the Factory System; by Edward Akroyd, M.P.*) in the transactions of the Social Science Association, I extract the following description of the resources and inducements for recreation which one manufacturer—the author of the paper—has provided for his nearly 5,000 operatives:—A library is attached to the works, to which "any of my workpeople have access free of charge. A news-room is provided, "supplied with the newspapers of the metropolis and of the locality, and also "with the current periodical literature. A band is established at the works, "and its performances are very creditable. It plays out of doors occasionally "when the weather is favourable, at other times in a room provided for that "purpose. Allotment gardens are provided for the workmen, and in connexion "therewith a horticultural and floral society has been established to promote the

During the fifteen years which have elapsed since the publication of Dr. Baly's paper, progress has been made toward removing from prison-life many causes of scrofulous disease; and as the fever-mortality of Howard's time long ago followed the removal of its causes, so, no doubt, the high tubercular mortality of prisons is at present in course of extinction.

It is to be hoped that the evil, as it exists in our great centres of manufacture, may prove to be not inevitable.

Removable causes have notoriously in many cases so much to do with the increase of tubercular disease, that it at least deserves patient and skilful inquiry to determine whether the development of phthisis among men and women engaged in manufacture really be an essential appanage of such employment, even when not excessively laboured in, or depend perhaps on defective ventilation and other removable accidents of the system. The opinion of the medical profession would certainly incline to the latter view. It would suggest that an inquiry into the sanitary circumstances of our great manufacturing populations must almost certainly lead to the discovery of evils which may be palliated or removed, and consequently to the indication of means for lessening this cruel tax on the industry of our people. Inadequate ventilation is an influence not unlikely to prevail where numbers of persons work together in one in-door employment; and medical experience would point very decidedly to this influence, wherever it exists, as an adequate explanation of high tubercular mortality.*

" knowledge and cultivation of fruits, flowers, plants, and vegetables. An " exhibition is held annually, at which prizes are given for the best produc- " tions of the respective gardens. To strengthen the habit of observation, and to " cherish a taste for the beauties of nature, I give prizes for the best collection " of wild plants and ferns growing in the neighbourhood. Recreation grounds " are provided for the juvenile and adult members of the establishment, and " every encouragement is given to the practice of healthy out-door sports and " athletic games."—J.S.

* One of the most eminent of French physicians, M. Baudelocque, writing in 1832, described this class of diseases as almost exclusively due to particular conditions of the atmosphere in which the patient resides: asserting, namely, that, if the houses are so placed that the sun's rays cannot reach them, or the fresh air be renewed without difficulty,—if, in short, they are small, low, dark, and badly aired,—scrofulous disease will inevitably supervene. And although his opinion in its extreme form is not generally received by the medical profes-

In corroboration of this view, I may cite the very important facts recently elicited by the Commissioners appointed to inquire into the Sanitary Condition of the Army. The Commissioners state that, "while in civil life [population of "24 large towns] at the soldiers' ages the deaths by pulmonary "diseases are 6·3 per 1,000; they amount in the cavalry to "7·3; in the infantry of the line to 10·2; in the guards to "13·8 per 1,000; and that of the entire number of deaths from "all causes in the army, diseases of the lungs constitute .... "in the cavalry 53·9 per cent.; in the infantry of the line "57·277 per cent.; in the guards 67·683 per cent." They argue, "that in civil life insufficient clothing, insufficient "and unwholesome food, sedentary and unwholesome occupa- "tions, and the vitiated atmosphere of unhealthy dwellings "all contribute to the propagation of this class of diseases. "But in the army it cannot be alleged that the clothing, the "food, or the nature of the occupation in itself are of a "character which would justify the imputation that they are "among the predisposing causes of the excessive mortality of "the soldier by pulmonary disease." And they accordingly conclude, "that the ravages committed in the ranks of the "army by pulmonary disease are to be traced in a great "degree to the vitiated atmosphere generated by over-crowd- "ing and defective ventilation, and the absence of proper "sewerage in barracks:.... this one cause acting with such "intensity, especially when superadded to a certain amount "of exposure, as not only to produce in the foot guards an "amount of the disease in question which is greater than is "produced in civil life by all the four causes united, but "which actually carries off annually a number of men in the "infantry nearly equalling, and in the guards actually ex- "ceeding, the number of civilians of the same age who die of "all diseases put together."

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sion, nearly all writers concur in recognizing the very great degree in which scrofulous manifestations depend on removable causes, and especially on unwholesome conditions of dwelling. Dr. Watson (in the recent edition of his Lectures, vol. i., p. 107) says,—"Scrofula depends in part upon hereditary con- "stitutions; it partly arises also from exposure to cold and wet; but there is "most reason for believing that impure air is a very powerful agent in calling "scrofula into action, and in aggravating the strumous diathesis."—J.S.

Pulmonary inflammations.

b. A second very important part of the mortality from pulmonary affections is that which consists in deaths from common *non-tubercular pulmonary disease* among the labouring population, And the best available materials for comparison are got by taking together all diseases, except phthisis, of the respiratory organs in the male population at ages above twenty. The local death-rates calculated from these materials range from 66 to 869. And Dr. Greenhow shows the important fact, that *high death-rates in the present category mainly depend on the local pursuit of particular branches of industry.* Two kinds of occupation are in this especially hurtful; first, those which give rise to mechanical irritation of the air passages, by diffusing in the air of work-places any considerable amount of metallic or earthy grit, or even of flax-dust or cotton or woollen fluff; secondly, those in which the operatives are exposed to abrupt changes of temperature. At the head of the first class, Dr. Greenhow places the mining of lead, tin, and copper; and he specially refers to "the most exclusively lead-mining district in "England," as one which loses by diseases of the chest in consequence of its prevalent employment a "larger annual "proportion of its adult male inhabitants than the un-"healthiest city in the kingdom," and as "the place in which "there is a larger proportion of widows than in any other "place in the kingdom." Towns which are the seat of fine manufacture in metals (especially of cutlery-manufacture) and towns where certain textile manufactures are carried on, and districts of pottery-manufacture, are shown to suffer high mortality from the same class of diseases. Again, in some of the above-named occupations, as well as in various other branches of industry, there are processes which require to be conducted at a high temperature; so that the operatives, especially in winter, are exposed to vicissitudes of heat and cold, and derive from this cause such liability to lung disease as affects very considerably the death-rate of the district. It is not easy to separate this influence from the other with precision enough for statistical purposes; but it seems probable that the high mortality of male operatives in pottery-manufacture may be more due to this cause, while that of

female operatives in the same manufacture would be rather due to mechanical irritation of the lungs. For the biscuit-rubbing (which diffuses a quantity of gritty dust) is chiefly done by women; while the slip-kilns (in which the pappy "slip" of clay and flint is evaporated at a high temperature) as well as the baking kilns and furnaces are of course tended by men.

It seems probable that in some districts the chronic inflammatory diseases which result from mechanical irritation of the lungs are not properly distinguished from true tubercular phthisis; and that deaths from the former diseases are often mistakenly certified for registration under the name of "consumption." Fallacy from this source is avoided by taking together as a single group all affections of the respiratory organs, *tubercular and non-tubercular;* and when this is done, the resulting scale of adult male death-rates is seen to range from 221 and 306 to 1,298 and 1,440. The two last death-rates belong to the two principal lead-mining districts: and, that their enormous excess depends on the prevailing male occupation, is made manifest by Dr. Greenhow's figures. He shows that in these very two districts, where the male death-rates are respectively 1,298 and 1,440, the corresponding female death-rates are but 717 and 779. And this fact is the more convincing, because it seems that, apart from interfering circumstances, the pulmonary death-rate of adult females tends to be somewhat higher than that of adult males.

Inflammations in infancy.

c. The *infantine death-rate from pulmonary affections* is a third very important head under which to consider our national mortality from that class of disease. Every year more than 23,000 children under five years of age die of inflammations of the respiratory organs, besides nearly 4,000 whose deaths are attributed to phthisis. And these 27,000 deaths are so unequally distributed, that the corresponding death-rate in proportion to the infantine population ranges from 213 in the healthiest district of England to 2,897 in the unhealthiest. The causes of this immense range of death-rate may most conveniently be considered as part of the general question of infantine mortality.

Mortality of young children.

4. The *death-rates of young children* are, in my opinion, among the most important studies in sanitary science. In the first place their tender young lives, as compared with the more hardened and acclimatised lives of the adult population, furnish a very sensitive test of sanitary circumstances; so that differences of infantine death-rate are, under certain qualifications, the best proof of differences of household condition in any number of compared districts. And, secondly, those places where infants are most apt to die are necessarily the places where survivors are most apt to be sickly; and where, if they struggle through a scrofulous childhood to realise an abortive puberty, they beget a still sicklier brood than themselves, even less capable of labour and even less susceptible of education. It cannot be too distinctly recognised that *a high local mortality of children must almost necessarily denote a high local prevalence of those causes which determine a degeneration of race.*

The Registrar-General has not for many years analysed the infantine death-rates of England. But on the one occasion, when he published such an analysis (relating to the years 1838–44) it appeared that in some districts the death-rates of childhood were five times as high as in others; and I have no reason to question that similar inequalities prevail at the present time.

Deaths which occur in excess within five years of birth are mainly due to two sets of causes; first, to the common infectious diseases of childhood prevailing with unusual fatality; and, secondly, to the endemic prevalence of convulsive disorders, diarrhœa and pulmonary inflammation.

Infectious diseases.

a. First, then, as regards the *infectious diseases of childhood*:—Scarlatina, measles, hooping-cough and small-pox have, during the eight years 1848–55, destroyed 297,555 persons. Their average annual fatality amounts to about 37,000 deaths. In about three-fourths of the total number of deaths, the subjects are under five years of age.

These diseases, both separately and jointly, have produced very different death-rates in different districts of England. But special caution is requisite in drawing conclusions from these death-rates. On the one hand, the diseases spread by

personal infection;—their diffusion in any district must commonly have been determined by the arrival of an infected person, and by his coming into contact with others who had not yet suffered from the infection with which he was suffering. On the other hand, atmospheric influences have apparently much to do with the epidemic spread of infection; and the influences most favourable to the process, in respect of one disease or another, are absent sometimes for considerable lengths of time.* The disease in consequence prevails very unequally in different years, and its inequalities are not simultaneous in all places. It may happen, especially with remote districts, that the infection is absent from among the population at a time when exterior circumstances are favourable to its extension and fatality; and a low death-rate may result from this accident. Or the opposite may be the case;—the infection may be present, with facilities for its personal communication, at a time when exterior chemical conditions are tending to produce what is called an "epidemic period;" and the result will of course be a widely different one. Single years are thus able to weigh so unequally in the calculation of local death-rates, that the comparison of such rates is inevitably fallacious, unless it be founded on the experience of considerable periods of time.† In the comparison which

* Such influences are very imperfectly known to us. Differences of chemical action in the atmosphere—perhaps differences of chemical action of solar light—seem especially to deserve study, but are hitherto almost uninvestigated. As regards some diseases (especially the diarrhœal) solar heat appears to tell with great effect; but mere difference of temperature does not make the difference between a year when cholera prevails epidemically and a year when it cannot become epidemic. With reference to the action of heat in favouring diarrhœal diseases, it is proper to remember Magendie's Statement (*L'Union Médicale*, 1852, p. 236) that by injecting into the blood-vessels two grammes or even one gramme of putrid material during very hot weather, he could produce death as certainly as by injecting three, four, or even ten grammes during winter.—J.S.

† When I observe, for instance, in regard of small-pox, that in certain districts its fatality in single years has been 40, 50, 60 even 90 per cent. of its entire septennial fatality, I am not disposed to consider seven years as a sufficiently long period for determining the true small-pox death-rate of small and remote districts. As a check on the tendency to draw too absolute conclusions from the vital statistics of short periods of time, it is instructive to notice what long periods are requisite for determining the laws of phenomena in other departments of science, where the disturbing influences are not more numerous than here. Mr. Glaisher finds "that a period of daily observations of 43 years " is insufficient to determine the mean daily temperature."—J.S.

follows, I refer to results on so large a scale that it seems impossible to misunderstand them.

Measles, hooping-cough, and scarlatina.

Looking only to very large masses of population, and comparing the four millions of population who occupy the south-eastern quarter of England with the two and a half millions who occupy the north-western counties, I find that the aggregate death-rate from *measles, hooping-cough* and *scarlatina,* among the latter population is more than twice as great as among the former. At first sight, one might be disposed to attribute this difference to the greater facilities for mutual infection which exist among the densely collocated population of the north-western counties, and to the consequently earlier age at which on an average the infection is likely to be contracted ;—influences, which of course count forsomething. But (as will presently be seen) certain non-infectious diseases of infancy, especially the convulsive disorders, are in even a greater excess in the same counties. And this fact renders it extremely probable that, if that denser gathering together of the population be the cause of the increased mortality from infectious disorders, it produces its effect not only by rendering the disorders more prone to spread, but likewise by rendering them more fatal to those whom they attack. In other words, it probably illustrates on a large scale one of the effects of overcrowding and defective ventilation, for there can be no doubt that these sanitary defects, existing to the degree in which they would develop the nervous disorders of infancy, would greatly aggravate the fatality of the infectious diseases in question. The fact perhaps further illustrates that very terrible possibility to which I have adverted—an increasing weakness of life in the population of our great centres of industry.

Other influences essentially connected with poverty, will tend to make all these diseases more fatal in places which are thronged with a poor labouring population. And possibly there exist in respect of each disease (especially perhaps in respect of scarlatina) certain conditions of local climate—unexamined conditions of soil and water-supply, for instance, which may be not indifferent to the result. But these matters are hitherto uninvestigated ; and I do not feel

justified in saying more, than they seem to me well deserving of investigation. For *the wide range of local death-rates from measles, hooping-cough and scarlatina, among districts where all the populations have undoubtedly had abundant means of becoming infected, leads to the conclusion that local influences of one kind or another must have been very greatly concerned in determining the proportionate fatality.*

Small-pox during the nine years 1848–56 killed 41,290 persons, being at the rate of 4,587 a year. As to the almost entire preventability of these deaths there is, among competent persons, no difference of opinion. In countries where vaccination is general, the fatality of small-pox has under its influence declined to some small fraction of that which formerly prevailed; so that where formerly in a given population there would have occurred 100 deaths by small-pox, there now occur as few as 4 or 5. Of those who still die of small-pox in England, the immense majority are non-vaccinated or ill-vaccinated persons; and *it is certain that, if vaccination were universally performed in the best known manner, deaths by small-pox would be among the rarest entries in the register.* Small-pox.

The absence of small-pox deaths from the mortality returns of any district, especially of a remote district, does not of necessity indicate that the population is well protected by vaccination; for accidentally it may have happened that during several consecutive years the contagion of small-pox has not been introduced, and that the protectedness of the population has in consequence been untested. But the converse proof is a sufficient one:—the presence of many small-pox deaths in local returns is evidence that vaccination is not satisfactorily practised. Accordingly, the very large continuance of small-pox to which I have adverted is among the most painful facts which are to be gathered from the registration-returns of England. To foreign nations, who have learnt from us the means of preventing small-pox, it must seem almost incredible that we still annually suffer four or five thousand deaths by the disease. And the Registrar-General's last quarterly report is in this respect

a curious illustration of the slow rate of social progress, containing evidence as it does that in *certain considerable districts of England, during the three months ending March* 31, *sixty years after Jenner's discovery, deaths by small-pox were amounting to a fourth part of the entire district-mortality.*

No evidence can be more conclusive than this as to the neglect of vaccination in certain parts of the country. But other evidence unfortunately is not absent. In the report which I had last year the honour to present on the subject of vaccination, and in a very excellent paper "On Public "Vaccination in England and Wales," communicated by Dr. Seaton to the Association for the Promotion of Social Science, such neglect is abundantly proved. "It is cal- "culated (says Dr. Seaton in the Memorial of the Epi- "demiological Society) that where the Vaccination Act "works well, 80 per cent. of the births will probably have "to be provided for by the public vaccinator. . . . In "looking at the infantile public vaccinations for 1854, there "will be found unions like Halifax, Biggleswade, and Lincoln, "in which there were respectively 73, 82, and 87 per cent. of "the births; while in Liverpool there were but 57 per cent.; "in Hastings, 44 per cent; in Newport, 40 per cent.; and "in Northampton but 27 per cent. Now what may be "done in a town like Halifax may surely be compassed in "Liverpool, in Newport, or in Northampton. There can be "no conceivable reason why the results which have been "attained at Lincoln should not be reached at Hastings. "If 90 per cent. can be vaccinated in the Conway union, why "should only 40 per cent. be vaccinated in that of Holy- "head? I need scarcely say, that it is not for a moment "contended that all unions should exhibit *the same* per- "centage of public vaccinations. In every union there will "be local circumstances to be taken into account,* which "will influence, and even in some districts (as the colliery "districts where special arrangements are made) influence "materially this per-centage; but, making an allowance for

* "The migratory character of the population in some unions, and the extent to which gratuitous vaccination is given by medical men, not public vaccinators, are circumstances of this kind."—J.S.

" these, no such discrepancies as those I have pointed out " ought to exist, and any objection which may be raised on " that score may altogether, or in a great measure, be got rid " of, by taking *the same* town in different years. Take " Durham, for example, in which the public vaccinations " were 71 per cent. of the births in 1854, 46 per cent. in " 1855, and again 60 per cent. in 1856; or Newport, 40 per " cent. in 1854, 62 per cent. in 1855, and only 33 per cent. in " 1856; or Devizes, 72 per cent. in 1854, 38 per cent. in " 1855, 29 per cent. in 1856; or Winchester, 68 per cent. in " 1854, 39 per cent. in 1855, 32 per cent. in 1856. In the " same town, with any regular system at work, the per- " centage of vaccinations would under ordinary circumstances " scarcely vary."

Acute non-infectious diseases.

b. Convulsive or nervous diseases, diarrhœa and *respiratory inflammations* may properly be considered together as regards their endemic prevalence among young children. Their conjoint operation is to destroy every year about 72,000 children, and thus to occasion about a sixth part of the total mortality of England. Eminently they are diseases of towns, perhaps especially of great manufacturing towns. And I take them together, because I have some doubts whether the comparative absence of one or even two of these diseases may not sometimes (either in fact or through errors of naming) be counterbalanced by the very high development of another, and whether it might not in consequence be easy to draw wrong conclusions from an isolated scale of death-rates by one of the diseases exclusively.*

It hardly needs to be stated that these diseases are produced by other than endemic influences. That abrupt changes of temperature and imperfect protection against cold favour inflammation of the lungs and air-passages, that improper food (specially likely to be given to the children of the poor) produces diarrhœa, that the irritation of teething and many other temporary influences cause convulsions, no one questions

* One remarkable case to illustrate this question may be quoted from Dr. Greenhow's paper. The highest death-rate by infantile nervous disorders (3,832) is in a district where the infantile death-rate from diarrhœa is only 35, and that from respiratory affections only 351.—J.S.

But why should the resulting death-rates vary as they do in different districts of the country? The average death-rate produced by these disorders in three of the healthiest rural districts of England (taken together, since these districts are small, to increase the basis of comparison) is 925;—in the unheathiest district of England the corresponding death-rate is 6,895. Why are these non-infectious infantine complaints seven times as fatal in one district as another? To answer this question let the diseases be considered separately.

Convulsive disorders.

First, of *nervous disorders incidental to early life,* there have died during the nine years 1848–56 as many as 330,881 young children, or annually almost 37,000. And the distribution of this large infantine mortality has been strikingly uneven throughout the country; the resulting local death-rates per 100,000 male children under five years of age having ranged, from 302, 355, 561, 836 and 847, to 2,938, 3,107, 3,301, 3,496 and 3,886. Some of the districts with low death-rates are small, and comparatively few additional deaths would have influenced their rate; but a fair estimate of the very great extent of real range, apart from all sources of fallacy, may be gathered from the fact that the average death-rate by these diseases throughout the north-western counties of England is about 2½ times as high as throughout the eastern, south-eastern, and south midland counties.

Two thirds of the deaths under consideration are registered as deaths by "convulsions;" and probably there is little real difference between these and the other cases which are grouped as "nervous disorders of infancy." Accordingly, the history which I am about to quote, though it nominally relates to only one form of these diseases, may be considered equally instructive in reference to them all. It consists in the remarkable experience of the Dublin Lying-in Hospital, as told by Dr. Collins, formerly master of the institution. Seventy-four years ago this experience was to the effect, that of 17,650 children born in the institution, 2,944 had died within the first fortnight; being more than every sixth child, or about 17 per cent. on the births; and that nearly all these deaths (19 out of every 20) had been occasioned by "nine-day fits." Dr. Clarke, who at that time was master, "considered a foul

" and vitiated state of the air in the wards of the hospital to " be the principal cause of this disease," and adopted arrangements by which " a free circulation of air was at all times " secured through the wards, and effected in such a way as to " put it out of the power of the nurses to control it." Of 8,033 children born subsequently to the wards being ventilated, as described, only 419 died; being about $5\frac{1}{5}$ per cent. on the births, or less than a third part of the previous mortality. Under additional improvements the death-rate became still further reduced. Among 16,654 infants born during the seven years of Dr. Collins's mastership, only 286 died—being 1·7 per cent., and of these only 37 from the disease which had formerly been so fatal; so that, within 50 years of Dr. Clarke's reform, the general mortality had been reduced to one tenth of what it was, and the special convulsive mortality to one sixty-eighth of what it was.

Secondly, the infantile mortality which arises in *non-tubercular diseases (almost exclusively inflammations) of the respiratory organs* is very large. In 1856 the deaths of children under five years of age from pneumonia, bronchitis and croup amounted to 28,763. Of the preventability of these diseases I cannot give so compact an illustration as that which I have just quoted in reference to the nervous diseases of infancy. But I may remark that their great prevalence in localities which have bred the largest share of certain other endemic diseases has often struck me; and that I have thus been led, from the time of my earliest engagement in sanitary matters, to class the pulmonary inflammations of infancy among the diseases which are oftenest of endemic origin. This view receives definite support from Dr. Greenhow's figures, which show a range of infantile death-rate by these diseases of the lung, from 155 as a minimum to 2,397 as a maximum. The mother—whose tendency it is to refer " taking cold " to out-door influences exclusively, and who, if her child's breathing ails, tortures her own conscience with doubts whether he has been exposed ever so little to one wind or another, and whether it would not be safer to keep him altogether within doors, might usefully study this part of the statistics. The more favour-

able of the death-rates under consideration are those of rural populations, the two lowest of all belonging to the two most northerly of Dr. Greenhow's 105 districts; while the high death-rates eminently belong to towns, and are no doubt mainly dependent on those poisonous in-door influences which attend in such large proportion on the urban residence of the poor, and develop to so great an extent the other forms of infantile mortality.

Diarrhœa.

Thirdly, by *diarrhœa* and *dysentery* there annually die more than 11,000 children under five years of age. The death-rate ranges, from an average of 76 in three of the healthiest districts, to 1,452 and 1,687 and 1,779. This in itself (unless infantile diarrhœa were an exception to what I have stated of diarrhœa generally) would suggest as almost certain that, in the places where the high death-rates prevail, there must be operating against the lives of the community those evils which specially depend on defects of house-drainage, with consequent non-removal of animal refuse from about the dwellings and water-sources of the population. And, in fact, it will be seen in Dr. Greenhow's tables, that the seats of a high diarrhœal mortality among young children chiefly exist amid those dense urban aggregations of life where the well-organised removal of refuse-matters is so specially indispensable to health. Part of the result, even a considerable part, depends no doubt (as is the case with all excessive infantile mortality) on the engagement of mothers in various branches of industry; which, leading to their absence from home, must occasion on a very large scale in some places the improper feeding of infants. But that the other influence is not inoperative—that the causes of adult diarrhœa are likewise to a great extent the causes of infantile diarrhœa—seems quite unquestionable. And in illustration of this statement, I cannot do better than quote the following very remarkable passage from the well-known work* of Dr. West on the diseases of early life. "Although (says Dr. West) while I "was physician to the Finsbury Dispensary, a large amount "of disease among children as well as among adults came

* Lectures on the Diseases of Infancy and Childhood. Third edition, p. 489.—J.S.

"under my notice, yet *my acquaintance with those severer "forms of infantile diarrhœa which approach to the charac- "ter of dysentery, and which give rise to similar lesions, "has been derived almost exclusively from observations in "Lambeth and the adjoining parishes.** The children in both "districts are alike subjected to the evils of improper and "insufficient food, and of close and ill-ventilated dwellings; "but in the latter there are superadded certain very import- "ant influences of a local character. A considerable portion "of this district on the Surrey side of the Thames lies below "high-water mark, and the kitchens and cellars of some of "the houses near the river become flooded at unusually high "tides. The sewerage throughout is very defective: in many "parts it is effected entirely by open drains, while in some "places there are mere cesspools which have no communica- "tion with any drain whatever. Cases of infantile dysentery "do not occur with the same frequency in all parts of this "district, but they are most numerous and most severe "wherever these noxious influences are most abundant."

Reverting, then, once more to the gross mortality due among young children to the conjoint action of those three classes of disease which I have now separately spoken of, I believe that *the vast range of that aggregate mortality in different districts of England is due to the varying prevalence of two local causes:—*

first, to differences of degree in *common sanitary defects* of residence; some places abounding more than others in the foul air and foul water of undrained, unpaved, unscavenged, unwashed, unlighted, unventilated localities and houses;—

and, secondly, to *occupational differences* among the inhabitants; there being certain large towns where women are greatly engaged in branches of industry away from homes; where consequently these homes are ill kept; where the children are little looked after; and where infants who should

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* "To this statement I may now add, that since the opening of the hospital for sick children, the patients of which come from much the same district as that inhabited by my former patients at the Finsbury Dispensary, I have not yet seen, among 3,400 cases, a single instance of severe dysentery."—J.S.

be at the breast are improperly fed or starved, or have their cries of hunger and distress quieted by those various fatal opiates which are in such request at the centres of our manufacturing industry.*

Means do not exist for appreciating at all accurately the proportionate influence of these two sets of causes. That the second of them is of great importance cannot be denied; and it is on this account, as well as on other accounts, a thing greatly to be desired, that the large manufacturing employers of female labour should address themselves to counteracting, as far as possible, the domestic evils which result from that system of industry. But lest the proportionate influence of this cause should be exaggerated, it is necessary to observe that the highest death-rate among infants, not only from the diseases here spoken of, but likewise from infectious diseases, exists in a large town where the population is not manufacturing. Taking together the common infectious disorders of infancy with those nervous and diarrhœal and respiratory diseases which have last been spoken of—an annual total of more than 100,000 deaths—we find that they are distributed in different places according to an aggregate death-rate which ranges from about 1,303 to about 9,044; that the low rate belongs as an average to three of the healthiest districts of England, and the high rate to the one unhealthiest district; that the last is not a manufacturing town; and that the causes in operation there to produce its immense infantile mortality must presumably be those unwholesome conditions of dwelling which local authorities, under the Nuisances Removal Act and other sanitary laws, are specially empowered to counteract.

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* Examinations which have been made of the causes of mortality of foundling-institutions, throw light on many influences which are likely to be injurious to infants whose mothers are withdrawn from them. A series of papers containing the result of such examinations has lately been published by Dr. Routh, in the British Medical Journal, 1858. Want of breast-milk is of course recognized to be a frequent and powerful influence in producing the high mortality of foundlings; but another and chief cause (according to the observations of M. Hervieux) is found to consist in the "want of exercise and the abuse of the "recumbent position" to which un-nursed children are especially exposed. The infant of the engaged mother would be almost as apt as the foundling to suffer from these evils.—J.S.

I have now spoken of those kinds of disease which, because of their immense fatality, deserve especial consideration. I have referred to facts which are notorious as to the causation of such diseases. In the subjoined figures you can read at a glance that vast range of their local death-rates which Dr. Greenhow has the merit of having made evident for public information. Summary of results.

1. *Annual death-rates, by diseases which are either wholly or almost wholly preventable under good sanitary arrangements, have ranged in different districts as follows :—*

Cholera.	Diarrhœa and Dysentery.	Continued Fever.	Small-pox.
From nothing to 403	From 4 to 345	From 21 to 209	From nothing to 146

2. *Annual death-rates, by diseases which to some considerable extent are inevitable, but of which the severity or the frequency may be controlled by good sanitary arrangements, have ranged in different districts as follows :—*

Tubercular Phthisis in Women.	Non-tubercular Lung-diseases in Men.	Common Infectious Disorders of Childhood.	Convulsive Disorders of Childhood.	Pulmonary Affections of Childhood.
From 229 to 588	From 66 to 869	From 694 to 2,149	From 280 to 3,832	From 213 to 2,897

And let me beg leave again to bring before you the several totals of death which year by year are thus unequally distributed. Looking at the last eight or nine years* for which materials are before me, I find that the annual average of deaths by the *three diarrhœal diseases* has amounted to 26,388 ; by *fevers* (typhus, typhoid, infantile and remittent) to 18,616 ; by *small-pox*, to 4,587 ; by *tubercular diseases* (male and female, at all ages) to 57,982 ; by *non-tubercular*

* For some diseases I have been favoured by the Registrar-General with the unpublished figures for 1856. In these cases my average is founded on the nine years 1848-56 ; in other cases on the eight years 1848-55.—J.S.

respiratory diseases (male and female, at all ages) to 50,273, whereof 23,020 have belonged to childhood; by the *common infectious disorders* to more than 32,000; by the *nervous disorders of childhood*, to nearly 37,000. Here altogether are 227,000 deaths, annually distributed with the utmost inequality. After reasonably estimating the degrees in which they severally are preventable, it can no longer seem so difficult to make a very large beginning towards striking off the annual 100,000 deaths against which the Registrar-General protests as deaths of artificial production.

Other preventable causes of death.

Many others remain; but, after speaking of preventable deaths which may be counted by tens of thousands, it seems almost trivial to dwell on diseases which annually kill but a few thousands among them.

Yet some of them deserve notice.

Ague.

Ague does not overtly kill even two hundred a year. Yet if one may judge by the experience of the Peterborough Hospital (where out of 1,394 cases during nine years only one proved fatal) the injured are immensely numerous in proportion to the directly killed.* And, beyond all doubt, the deaths are much less infrequent than they seem; for when the malarious influence destroys life in this climate, almost always it is by secondary results; and the deaths which thus occur are registered, not as ague-deaths, but as due to dropsy, or liver-disease, or other abdominal affection.

It needs not now to be shown that ague is preventable. Before the time of the great fire of London—or let me rather say, before the better draining and paving which attended the reconstruction of London—endemic ague was among the most prevalent and most fatal diseases of the metropolis. Even a century ago, according to Dr. Fothergill, it still had a considerable prevalence. Now it is scarcely (if at all) known to us, except as imported from the undrained marsh-districts of other parts of the kingdom, where appropriate means have not hitherto been employed for its extinction.

Scurvy.

Purpura and *Scurvy* annually kill from two to three hundred persons. In their origin and nature these diseases

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* *See* Dr. Greenhow, *seq.*, page 105.—J.S.

are different; and it is therefore to be wished that they could have been separately enumerated.* Scurvy, it is well known, is but a modified starvation, dependent on the absence of vegetable food. It was this disease which used to decimate our navy and render long sea-voyages almost impossible. It was mainly by scurvy that Anson, in his celebrated voyage of 1740–2, lost within the first ten months nearly two-thirds of his crew, and during the remaining period about half of the survivors. It was against scurvy that Cook had attained his great success, when in 1775, after three years' absence, he brought back a healthy crew, which, out of 112 men, had lost only one by disease. And the perfect preventability of scurvy is well shown in the experience of our navy; from which, even in the year 1780, Haslar Hospital received as many as 1,457 cases; and in which at present the disease is never seen. Undoubtedly, therefore, it is by neglect of sanitary precautions, and through punishable disobedience to the law,† that scurvy to a considerable extent still prevails in our mercantile marine, and that so many cases of great severity are still received into civil hospitals situated in the neighbourhood of our docks. In land-life the common consumption of the potato serves so completely to prevent scurvy, that poverty perhaps never becomes an occasion of the disease, except when the potato-crop has failed. Voluntary abstinence from vegetable diet is sometimes, but very rarely, the circumstance to which an individual case of scurvy on shore may be ascribed. But the main source of such scurvy as still exists in England is no doubt maritime, and depends on the absence of due provision for the diet of crews during long voyages. The "Weekly Return of new cases of sickness in the public insti-" tutions of the metropolis," communicated to the Board of Health by the Association of Officers of Health, has occasionally

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* In the Registrar-General's Report for 1855, scurvy is distinguished from purpura. Out of 197 male deaths and 127 female deaths attributed to the two diseases, sixty male and thirteen female deaths are especially referred to scurvy.—J.S.

† Mercantile Marine Acts: 7 and 8 Vict. cap. 112.; 13 and 14 Vict. cap. 93.; 14 and 15 Vict. cap. 96.; and the Passengers Act, 15 and 16 Vict. cap. 44.—J.S.

during the last few months quoted striking facts of this kind from the experience of the hospital ship "Dreadnought."*

Puerperal fever.

Puerperal Fever is registered as killing about 1,500 mothers a year. Probably other fatal cases of the disease are included in the list of about 3,000 women annually described as dying of *peritonitis* and of *childbirth*. Statistically, the number is not large. But every one must wish it were less; for death rarely falls with more individual heaviness than when it comes in this form to rob the household of a mother in her happiest and hopefullest moment. And the death strikes every observer so essentially in the light of an accident, that it makes more impression of suddenness and evitability than almost any death not actually by violence. Fortunately the disease is in a very unusual degree preventable; for the experience of Lying-in Hospitals enables us quite confidently to class it among the putrid infections. Its propagation has in too many instances been traced to personal agencies which, now when they are understood, it would be criminal not to guard

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* Ex. gr. October 24; "All the scurvy cases [six] were returning from "India, and came in *two* ships; in one, all the provisions were bad; in both, the "lime-juice. It is the common tale in all scurvy cases admitted here, that the lime-"juice was either bad or deficient."—November 7; "One of the [new] scurvy "cases occurred in the return voyage from the East Indies; there were sixteen "hands working the ship, and fifteen had scurvy; the provisions were good. "The lime-juice taken from England was expended on reaching India, and "what they had obtained there turned bad before they were out of the "Bay of Bengal; consequently they were without this necessary during the "remainder of the voyage."—November 28; "The case of dysentery is that of "a man who has previously suffered from the same disease, and who ascribes "its recurrence to cold and the want of *lime-juice* in returning from India; "the lime-juice supplied having been stale and unfit for use."—December 5; "Three cases of scurvy were admitted from the ship 'Ardbeg,' belonging to "Glasgow. The provisions were tolerably good, but only two table-spoonfuls "of lime-juice were allowed every eight days. The Act requires half an "ounce of lime-juice to be given daily, but it is little attended to."—Janu-"ary 30; "A case of scurvy was admitted from a Hamburg vessel, destined "for California, with six hands, five being disabled by scurvy."—March 13; "Ten cases of scurvy have been admitted. Five of these patients are from "the 'Countess of Seafield,' from Shanghai. The crew consisted of ten; out "of which one died, and six were disabled by scurvy. None of the officers "were affected. The passage lasted four months and twenty-one days. Only a "gill of lime-juice and a pint of vinegar were allowed per fortnight for the first "two months. Even bread was deficient. The other cases came from the "'Sirocco,' of Sunderland, from Bombay, and the 'Jane,' of Liverpool, from "Callao."—J.S.

against; and its ordinary origin stands in intimate relation to sanitary faults which never ought to surround either the healthy or the sick.

In respect of the General Lying-in Hospital in the York Road, during the twenty years 1837–56, Dr. Rigby, the physician of the Institution, has publicly alleged that the mortality (almost entirely from puerperal fever) ranged, *according to the efficiency or inefficiency of ventilation*, from less than 5 to more than 90 per 1,000 cases delivered. Exception having been taken by the Committee of the Hospital to some parts of Dr. Rigby's statement, the statistics were re-examined, with special regard to any questionable facts, by Dr. Odling, the Medical Officer of Health of Lambeth. This gentleman, setting aside periods in regard of which any doubts could be raised, and comparing ten years during which he believed it to be "admitted by both parties, that systematic "ventilation *was not* practised," with seven years during which he believed it to be "admitted by both parties that "systematic ventilation *was efficiently* practised," found that during the former period the death-rate had been 46·42, during the latter period only 4·81, for every 1,000 deliveries. And after making allowance for other influences (among which serious defects of drainage had been mentioned) Dr. Odling concluded his letter to the Committee by pointing out "that for seven years co-incidentally with efficient venti-"lation there was an extraordinarily low death-rate, and "that the change from ventilation to non-ventilation was in "a few months time followed by an increase of mortality."

That women may receive the infection of puerperal fever at the hands of those who previously have been in attendance on cases of erysipelas, is now among the certainties of medicine. It has been established by a large amount of very fatal experience. And that the same contagion may arise in ordinary post-mortem putridity, and be propagated from this source, is likewise certain. Immense mortality from puerperal fever in one division of the Vienna Lying-in Hospital, varying from about a fourth to about a ninth part of all the deliveries which took place there, was believed by Dr. Semelweiss, the head of the department, to depend on an

infection of which "the *real source was to be found in the* "*hands of the medical men in attendance contaminated* "*with cadaveric poison.*" The other division of the hospital (reserved for the practical instruction of midwives, whose training does not require them to be brought into contact with dead bodies) suffered only about a tenth part as much as the first; and this was the more noticeable as the second division was inferior to the first in the size and airiness of its wards. Dr. Semelweiss, acting upon his supposition as to the cause of the disease, required that the male attendants of the first division should, as much as possible, avoid contact with cadaveric matter; that after such contact they should never make a vaginal examination till the following day; and that, besides very thoroughly cleansing their hands, they should systematically *disinfect them with a solution of chlorine.* The latter precaution was not introduced till some months after the more general precautions had been adopted. The result of these measures was, that the mortality of the first division at once fell to the usual average of the second division. In 1846, the death-rate per cent. had been $13\frac{2}{3}$; in 1847 it was $5\frac{1}{5}$; in 1848 it was $1\frac{1}{3}$.*

Erysipelas.

Erysipelas, under its own name, kills about 2,000 a year, and under other names, perhaps many more. It has two forms not distinguished in the registers, and probably not essentially different; whereof one particularly belongs to surgical practice, as an occasional very serious complication of wounds. The poison of this *traumatic erysipelas* seems to be identical with that of puerperal fever. Intimately associated with the atmosphere which breeds it, are other calamitous influences, which are apt to prevail with erysipelas epidemically in the wards of ill-kept hospitals, threatening every open wound of every patient who lies there, arresting the vital processes of repair and putrefying its material, infecting the whole blood with mischief propagated from the part, converting slight injuries into grave dangers, and often defeating the success of the best-performed surgical operations. The experience of the old Hôtel Dieu (*maison de Dieu, porte du ciel*) was in

* *See* Dr. Routh on the Epidemic Puerperal Fever of Vienna. Med. Chirurg. Trans. xxxii.—J.S.

this respect most lamentable: and no wonder—when Howard used to see "five or six in one bed, and some of them dying"—that "hardly any acute cases, childbed cases, or capital operations survived," or that the operation of trepanning was laid aside as one which for fifty years had never been known to succeed.* The Scutari Hospitals, during the earlier part of the Crimean war, illustrated a similar connection of cause and effect, under circumstances to which I have already adverted;† and here, as in the Hôtel Dieu and in innumerable other instances, the evil ceased under a system of stricter cleanliness, improved ventilation, and diminished crowding. The old hospital ship "Dreadnought" had acquired a very evil reputation for the prevalence of these infections; dependent, no doubt, in part on the natural ill-adaptedness of a ship to the purposes of a hospital; but probably also in part dependent on organic contamination still lingering in the wooden walls of the wards. Early last year another more commodious ship was substituted for the "Dreadnought;" and Mr. Tudor, the resident surgeon, informs me that, whereas in the two years preceding that change 9 out of 22 amputations had terminated fatally, only one amputation had proved fatal out of 16 performed in the year following the change; and that, whereas formerly erysipelas and hospital-gangrene were so common and so spreading as to have let him see there at one time as many as 18 cases of hospital-gangrene, he has now scarcely seen erysipelas, except in patients admitted with it, from whom, as a rule, it no longer spreads to other inmates of the ward.

Traumatic erysipelas, hospital-gangrene, pyæmia.

Erysipelas of the kind which is not associated with wounds has, in some respects, more affinity to the eruptive fevers than to the above-mentioned traumatic diseases, and might therefore perhaps conveniently be called by a distinctive name. But the circumstances under which it arises have appeared to me so often to be circumstances of local unwholesomeness, that I am disposed to believe there is little essential difference between this form, which begins as a

Erysipelatous fever.

* *See* Sir Gilbert Blane in the remarks on St. Thomas's Hospital, in his paper on the Prevalence of Different Diseases in London.—J.S.

† *See* preceding page 24.—J.S.

febrile attack, and the other form, which begins as a local infection; and as the latter is quite unquestionably due to defective sanitary conditions, so I have strong suspicion that the former will be found a very infrequent disease when the causes of other endemic contagions have become less rife.

Insanity.

Insanity, according to the registers, causes only 500 deaths per annum; but of 7,650 deaths annually attributed to *paralysis*, and 1,840 annually attributed to *epilepsy*, many, no doubt, are of insane patients. It deserves attention that, so far as very imperfect statistics can determine the matter, insanity appears to be increasing in this country. In the last (eleventh) report of the Commissioners in Lunacy it is mentioned that in 1852 the number of pauper lunatics and idiots was returned by the Poor Law Board as 21,158; but in 1857, as 27,693. No disease has less immediate connexion than insanity with such exterior influences as are under the control of local sanitary authorities; but there is not an absence of indirect connexion. The mental activity which belongs to eager competition in a crowded and ambitious country is a frequent cause of cerebral disorder to persons who from parentage or other circumstances are predisposed to it; and this special influence is, of course, likely to develop itself in proportion as the particular period is fraught with occasions of excitement and fatigue. But what deserves here to be borne in mind, just as in reference to the development of scrofulous and tubercular disease, is the great power of all depressing circumstances to co-operate with the special cause. Those whom privation or disease has recently exhausted, or whose health is chronicly deteriorated by unwholesome conditions of occupation or residence, succumb to the operation of mental causes which the brain of the healthy body could bear without injury. It is under such circumstances that many of our labouring classes suffer their first access of mental derangement; and I have every reason to believe that if we could obtain accurate statistics of the local distribution of insanity we should find its excesses among those parts of the adult population which suffer the largest preventable mortality from consumption and its kindred disorders.

Violence in more than 14,000 annual instances, is the registered cause of death. Generally on this class of premature deaths, I have not yet been able to make my inquiries with sufficient minuteness to learn what prospect there may be of lessening their large annual amount, and can only venture to name some among them which to my present knowledge seem susceptible of reduction. Violence.

In about 422 of the above cases fatal *poisoning* was discovered. To what further extent it may have operated without discovery, and to what extent the adulterations of food and drugs have been hurtful to life, are questions which at present I have no means of solving. The law (Vict. 14 and 15, cap. 13.) which forbids arsenic to be sold otherwise than coloured, and except with full registration of the sale and in presence of a witness known to both buyer and vender, has probably diminished the felonious uses of that drug; and an extension of the principle of that Act, to the regulation of the sale of all such poisons as are commonly used for criminal purposes, would greatly diminish the present almost unrestricted facilities for clandestine homicide.

In more than 5,000 cases *wounds*, *fractures*, and *contusions* are specified as having been the causes of death; some of them homicidal, but the very large majority accidental; and of the latter, some self-inflicted by the sufferers, while many arose in the carelessness of others. It is specially the last of these classes which already has been reduced, and probably admits of still further reduction. Whatever acts of legislation, or whatever decisions from the bench, tend to increase or fix the responsibility of persons for accidentally injurious consequences of their neglectful acts or omissions, must operate in this direction; and it seems certain that the "Act (Vict. 9 and "10, cap. 93.) for compensating the families of persons killed "by accident" has therein been of essential service. The Factory Act (Vict. 7 and 8, cap. 15.) and the Act for inspection of Coal Mines (Vict. 13 and 14, cap. 100.) have no doubt greatly reduced the frequency of serious accidents in both those branches of industry by increasing the responsibility of employers. Yet in 1854 the coalminers were represented to

be still losing 1,000 lives per annum from accidents of a preventable kind.

Among the 14,000 lives annually lost by violence are counted more than 1,800 cases where children are *burnt or scalded to death.* These numerous deaths by fire, and other still more numerous injuries which are not fatal, are referable to the domestic habits of parents; occurring almost exclusively among the poorer classes, where children cannot possibly be tended with the same vigilance as among the rich. Probably a large share of such casualties arises during the absence of mothers engaged in branches of industry which take them from home; and it seems likely that the evil would diminish with the development of well-conducted *crêches* and infant schools, which, on other accounts, are so very greatly to be desired for the infant population of places where mothers are engaged in manufactures and other non-domestic industry.

Intemperance and other moral causes of premature death.

About 314 among the violent deaths are annually attributed to *intemperance.* Unfortunately that number expresses only a trace of the mischief which is done to human life by the abuse of spirituous liquors. But it opens the very difficult question of *preventable deaths arising in moral causes;* and I should be dealing uncandidly with my subject, if I did not expressly admit, in relation to it, the reality of that class of causes, and the greatness of their influence, direct and indirect. Not only do intemperance and profligacy create diseases which, except for them, would have no existence;* but also they act immensely in aggravation of the endemic causes of disease; adding to what is horrid and deadly in the unwholesomest haunts of our large cities, and rendering it a greatly more difficult task to remove such evils as are simply physical. Yet, that full justice may be done, let us well remember that such physical and such moral conditions act and re-act on one another: that, among the local circumstances which are hostile to health, some of the most prominent are equally hostile to moral and intellectual education. It has been my duty to make myself intimately acquainted with places

* Every year from four to five hundred infants are registered as having died from congenital syphilis.—J.S.

respecting which it may with truth be said, that vice and ignorance and brutality are among their active causes of disease: but from my first moment of personal intimacy with such places till now, my feeling has grown stronger and stronger, that populations, born and bred in such slums of cities as are nurseries of physical disease, must find it difficult to evolve survivors who shall not be vicious and ignorant and brutal. The same soil nurtures both growths of misery. And if social reformers of the two sorts addressed themselves jointly to those afflicting scenes, it would be no easy problem to determine whether, in their co-operation, the schoolmaster and moral teacher were doing more for the bodily health, or the sanitary improver doing more for the progress of education and the lessening of crime.

Conclusion.

In commencing this introduction to Dr. Greenhow's paper, I stated that his results appeared to me of singular importance in their bearing on sanitary administration. And it is in this practical respect that I venture to beg for them your particular attention.

It is possible that, from accidental circumstances which would only reveal themselves to a local inquirer, his figures may here and there convey a not quite perfect picture of the real state of a district. It is on this account that I have refrained from particularising any district by name in connexion with remarks which could not be other than condemnatory, lest ever in the individual case I should have overlooked even a fraction of extenuating circumstance.

But, as regards all that is of substantial importance in the figures, there is no room for fallacy. But any one who will candidly consider *what are the possible meanings of those differences of death-rates,* only one conclusion can, I think, at last be arrived at. The diseases which are shown to prevail in different districts with such surprising degrees of inequality are eminently the diseases which can be prevented. And to me the conclusion seems inevitable that in certain parts of England, sometimes by good fortune, sometimes by good local government, definite causes of disease are kept at or near their

least conceivable activity; while, in other parts of England, the same causes are prevailing with as little check as if the community were one of savages to whom science had never taught her first and simplest lessons.

My own seven years' experience in the service of a local sanitary authority has given me a strong belief in the general disposition of such authorities to exert themselves efficiently against the causes of premature death, when but once they have become fully and publicly informed of the existence and fatality of such causes. *Fully informed,* I say;—because the non-removal of evils which occasion so much human misery commonly depends much less on the supineness of the local authority, as its primary cause, than on the absence of local consciousness as to the real facts of the case. *Publicly informed,* I say;—because local sanitary authorities, exercising their powers virtually without control, and being, like individual men, not incapable of indolence and error, peculiarly require that their fulfilment of very important duties should be subject to public criticism. Failing this check, it is unquestionable that the existing constitution of such authorities must sometimes endanger the objects for which they are constituted. Elected on the principle of being the representatives of rate-payers, the members are sometimes a little apt to forget that, for sanitary purposes, they are also the appointed guardians of masses of human beings whose lives are at stake in the business. They do not always remember that the interests of life are at least as sacred as the separate interests of pocket. And this danger especially deserves to be guarded against; for it has not infrequently happened that local owners of low house-property have procured themselves to be elected members of sanitary boards with a view to the protection of their own unworthy interests by systematic resistance to sanitary improvement.

The suggestions which I would respectfully offer, for dealing with what appears to me a great national question, are based on this view of the case. Holding the opinion which I have stated as to the meaning of high special death-rates; feeling convinced that they substantially depend on the non-removal of local and removable causes, and that this non-removal

commonly results from the absence of adequate local information as to the nature and extent of the existing evils; I would look to the systematic publication of facts, and to the influence of general opinion, as the main agencies of cure. In the last resort, if these means should fail, other remedies would assuredly not be wanting.

I submit that all such cases of high special death-rates as have been referred to in the present paper, ought to be thoroughly investigated; that *the local public and the general public and the government and the legislature ought to have before them the precise facts of each case where a preventable or partly preventable disease prevails to great excess in any particular district.*

Under the public Health Act, 1848, the Government had the power of enforcing the adoption of that Act on any locality wherein the general death-rate had on a seven years' average exceeded the common death-rate of the country. Under the Local Government Bill now before Parliament, this central power is no longer to be retained. And if it be a well-founded opinion which I have ventured to express, that the sanitary progress of localities is almost an educational matter (wherein enlightenment counts for much more than compulsion) the resignation of that power is no loss to the objects in view. But the absence of such compulsory power makes it, I submit, all the more urgently important that *the department on which will devolve the present medical responsibilities of the Board of Health should have under its habitual cognisance the class of cases to which I have particularly referred.*

The Public Health Bill now before Parliament, will if it become law provide for this object. Her Majesty's Privy Council, empowered to "cause to be made such inquiries as "they see fit, in relation to any matters concerning the public "health in any place or places," will be able to bring before local authorities, and the people under their jurisdiction, the facts in which the latter are so greatly interested. The appointed officers will be able to state, not only in such general terms as I have here employed, but in terms distinctly applicable to each case investigated, what local evils

have to be removed in order to abate in various districts their present tenfold or hundredfold multiplication of some preventable disease.

But it is only to a limited extent that this kind of inquiry, as an action of Government, would be possible. The 105 districts of which the statistics are included in Dr. Greenhow's paper constitute merely a sixth part of the registration districts of England. The entire question relates to removable causes of death operating on eighteen millions of population. Government inquiry could scarcely do more than indicate year by year in a summary way the broad facts of glaring cases. It could not supersede, nor ought it to supersede, the necessity for great local exertions where so much human life is at stake. And it seems to me a very obvious conclusion to draw from the immense disparity in the pressure of different diseases, that *local authorities, most of all where large urban populations are concerned, are imperatively bound to keep themselves properly advised by skilled officers as to the special causes of disease operating within their respective jurisdictions.*

Throughout the greater portion of England the local authority under the Nuisances Removal and Diseases Prevention Acts is also the authority or part of the authority for poor law relief. In all such portions, therefore, it stands in relation with the system of medical attendance which (covering the whole country) is part of that relief; and nothing would be easier than for the sanitary authority, under these circumstances, to be kept tolerably conversant with whatever relates to the sanitary condition of the poor. Wherever local boards of health exist, they already possess the power of appointing medical officers; but where municipal corporations and improvement-commissioners are the sanitary authority, they commonly have not obtained in express terms the power of making such appointments. It seems desirable that the power should universally be held. And in respect of large towns, especially of large manufacturing towns, I am strongly of opinion that it should be obligatory on the local government either (as in the districts of London under the Metropolis Local Management Act) to appoint permanent officers of

health, or to obtain periodical reports from occasional medical inspectors.

There is a fatal misapprehension in many minds as to the time when such officers may be useful. Too commonly it is imagined that the time for their activity is the time when epidemic disease is present; too commonly it is unknown or forgotten that just at such a time they are least able to do good. The local conditions which favour epidemic visitation are conditions which for the most part it takes time to create, and which it always takes time to remove. The death-rates of certain ordinary diseases measure those local conditions, and predict where are the sure places for epidemic mortality to fall. It is in the interval between epidemic periods that measures may be taken which, while they reduce those ordinary death-rates, give security against the dreaded invasion. But in the moment of pestilence little can be done. Administrative bodies may suddenly have leapt, under stress of terror, to the point at which scientific information has for years been standing; panic may have rendered them as docile as they just before were incredulous; but radical sanitary reforms cannot be extemporised. If some hundreds of thousands of people in the middle of a cholera-epidemic find themselves (as was the case a few years back in Rotherhithe and Southwark and Lambeth) drinking water polluted with sewage, who is there that at a moment's notice can transplant the pumps and pipes of the water-supply? Or if the broad river amid a dense population has been allowed, in spite of all warnings to the contrary, to become the tidal sewer of a gigantic city, what intensity of alarm, when at last it is awakened, can shorten the years which must elapse before the consequences of that error are effaced?

But farther, the ordinary, not the extraordinary diseases, are those which most call for sanitary reform. Let local authorities do their utmost against the daily diseases of their districts,—against the diarrhœa, against the typhus and typhoid fevers, against the small-pox, against the phthisis, against the special diseases of operatives, against the murderous mortality of infants; confident that in taking this course they will be adopting the best precautions against occasional pestilence;

and equally confident that, in abating year by year whatever are the local redundancies of habitual disease, they will be counteracting causes of death far more powerful than those which, because of their suddenness, seem so terrible in the moment of exceptional visitation.

It is to the *vast excess of severity wherewith those habitual disorders press upon certain parts of the population*, that I especially point as the presumptive evidence of corresponding sanitary faults. And the fact that those disorders are developed, some of them *in proportion to the urban character of the district*, some of them *in proportion to the manufacturing industry of the people*, is matter for very painful reflection.

Every year now adds to the relative growth of our town populations: every year increases the development of our manufacturing system; and there can be no well-wisher to the country but must rejoice in what is great and good in those wonderful manifestations of our national life. But surely it is needful to consider, whether the advantages of our social progress must have with them such evils as I have described; whether the higher civilization of urban life cannot be attained without a corresponding development of diseases which depend on the non-removal of excrement, and the non-ventilation of dwellings; whether the manufacturing greatness of England be not compatible with better sanitary care for the lives of the employed, and with less enormous entail of infantine disease.

These questions are not uninteresting to the ratepayers of places where high death-rates prevail. For sanitary neglect is a mistaken parsimony. Fever and cholera are costly items to count against the cheapness of filthy residence and ditch-drawn drinking-water: widowhood and orphanage make it expensive to sanction unventilated workplaces and needlessly fatal occupations.

Nor is that the only sense in which such questions concern the public economist. For the physical strength of a nation is among the chief factors of national prosperity. And with us, of late that raw material may well have risen in value, while eastern war and westward emigration have been draining

into their respective channels so much of our English manhood.

And if the subject may justly claim to be considered by the government and the legislature of this country, it is not only on such grounds as those. The sacredness of human life against unjust aggression is the principle above all others by which society subsists. To have realized this principle in law and government is the first indication of a social state: and in any community pretending to be civilized, the failure of protection for life has ever been felt as a public scandal.

For a time it was only against brute violence that the knowledge of the legislator enabled him to cope in founding the conditions of personal security; and his duty was sufficiently fulfilled when his enactments were commensurate with his knowledge. But modern civilization would scarcely have deserved its name if, with the light of its much greater knowledge, it had refrained from applying the same principle to all cases which fairly fall within its terms; and our statutes contain abundant evidence that, according to the spirit of English law, life cannot rightfully be wasted by neglect any more than it can rightfully be taken by violence.

It is indeed only by very gradual increase, that legislation and government can succeed in giving to human life the same security against the infliction of preventable disease as against the infliction of wilful violence; and millions may have died before this public carefulness for individual safety can have become co-extensive with even the present certainties of preventive medicine.

But growing knowledge will bear its fruit. It has now been fully recognized that, within the very centres of civilization, controllable influences are working against human life more cruelly than brute violence ever worked in the first discordant beginnings of society: it has been shown that in certain districts of England the operation of those controllable causes is vastly more powerful than in others; that, within the rule of certain sanitary authorities, particular forms of disease undergo a multiplication—a five-fold and ten-fold and twenty-fold multiplication—of their lowest

familiar fatality. To suppose that such sanitary authorities can permanently disavow an interest in this knowledge, or that public opinion will long hold them irresponsible for so monstrous a waste of life, would be to misunderstand the meaning of civilisation, or to belie the humanity of England.

I have the honour to be, Sir,

&c., &c., &c.

PAPERS RELATING TO THE CONSTITUTION OF THE MEDICAL PROFESSION, &c.

PAPERS RELATING TO THE CONSTITUTION OF THE MEDICAL PROFESSION, AND TO THE OPERATION OF THE MEDICAL ACT, 1858.

Memorandum prepared in 1858 by the Medical Officer of the General Board of Health.

Constitution of the Medical Profession.

I. The objects which members of the Medical Profession desire to see realized by any legislation affecting their body, are understood to be chiefly these:—

1. that such legal definition be given to the term "qualified "medical practitioner" as shall make it signify a person who has fulfilled certain conditions of age and education, and passed certain appointed examinations, and that none but persons in this sense legally qualified be competent to hold any public medical appointment, or to give any medical certificate, or to recover payment for any medical attendance;

2. that an authentic Register be kept for annual publication of all legally qualified medical practitioners;

3. that it be made a misdemeanour for any person falsely to assume a title or description implying him to be a legally qualified medical practitioner;

4. that the names of persons guilty of certain disgraceful offences be removable from the register;

5. that the legally qualified medical practitioner be entitled to practise equally in all parts of the United Kingdom without hindrance from any local restrictions.

It is believed that no valid objection will be raised to the fulfilment of these objects by legislation, if only, in the interests of the public, such fulfilment be made subject to this essential condition: that, if the "qualified medical

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" practitioner " is to be in any special sense recognized at law, and in even the smallest degree protected and privileged against competition, ample security must be taken as regards future admissions to the profession, that the *legally-qualified* medical practitioner shall be a *well-qualified* medical practitioner.

II. It thus becomes necessary to inquire into the constitution and practice of the present Examining Boards of the medical profession, and to consider how far the system under which they confer their respective titles furnishes that required security.

1. Titles purporting to certify the medical attainments of their bearers, may at the present moment be obtained from twenty-one* different sources within the United Kingdom. These titles are given entirely without concert among the several institutions which award them, and without responsibility to any common authority. They represent twenty-one different standards, each fixed and varied at the discretion of the authority which applies it, of what is the minimum knowledge wherewith a candidate may properly be allowed to practise part or all of his profession; so that "Doctor," and "Physician," and "Surgeon," and "Apothecary," are words which have no general and settled meaning, either as to the kind and degree of education implied in each title respectively, or as to the sufficiency of the examination through which the bearer must have passed.

There are examining institutions which derive great part or the whole of their income, not as payment for the examinations they conduct (since rejected candidates commonly pay no fees) but as payment for the titles and certificates of approval which they bestow. Candidates, while the option is allowed them, naturally resort by preference to those tribunals where the requirements are least; and the income which institutions may derive from this preference increases in proportion as the examination is indulgently conducted.

* This number includes two Aberdeen colleges, which have since been consolidated into one authority; and it includes the Archbishop of Canterbury.—J.S., 1870.

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On what has taken place under this system, it may suffice to remark that within the profession itself, on occasions when medical reform has been agitated, and rival institutions have criticised each other's proceedings, there have been frequent and reciprocal imputations of the most disparaging kind. Not only has attention again and again been called to the virtual irresponsibility of the Examining Boards, and to the fact that for the most part their pecuniary interests militate against a strict performance of their public duty; but eminent members of institutions granting medical titles have asserted or insinuated against other examining institutions, that public confidence is wrongly reposed in them, and that their titles are insufficient evidences of professional qualification.

Existing members of the profession complain bitterly of its overthronged state. They complain of a competition which makes it a hard struggle for even the best qualified to prosper; a competition which reduces them to the necessity of accepting, even of soliciting, unpaid or inadequately paid offices; and which tends to demoralize professional life by offering rewards to the mere art of attracting public notice. Against this numerical increase of the medical profession the public can have nothing to say, so long as each admission is of a thoroughly qualified practitioner; for—subject to this condition—the larger the supply, the better will the public be served. But the public and the profession are equally and greatly interested in demanding that an over-numerous competition be not sustained by undue laxity in the admission of new candidates; and any reasonable complaint from the profession, that its ranks are over-full, evidently justifies the public in concluding that the standard of professional qualification might already with propriety have been raised.

With regard to the future, it is sufficient to notice that at least a possibility of very gross abuse is inseparable from the present system of irresponsible rival Examining Boards; and it is not one on which Parliament could be invited to rely, as a sufficient security for public interests. Probably

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the entire profession will here concur with the views expressed by one of its most distinguished members: that, "the "object and intentions being the same in respect of the "requirements of the community, an urgent necessity exists "for so far assimilating the qualifications, that the privileges "conferred by the diploma or license shall never be used as "a lure by any licensing body which might choose to enrich "itself by lowering the standard of education, and debasing "the character of the profession."

The standard, by which hereafter to accept or reject a candidate for the medical profession, if this profession is to be specially recognized at law, ought to be determined by two conflicting considerations. On the one hand, the highest scientific and practical teaching of the day gives a level to which, for the public interests, it were desirable that every candidate should have risen;* on the other hand, in order not unduly to restrict the supply of tolerably competent practitioners, some reasonable indulgence is necessary. How is the compromise between these considerations to be arrived at? From the nature of the case, such a standard cannot be fixed by Act of Parliament. It must vary with the circumstances of the time; and the responsibility of regulating its application can but be entrusted to competent and disinterested judges.

2. Besides the evils which must belong to irresponsible competition among Examining Boards granting similar titles, there is in the present system this further evil. Some titles purport to be given after examination in all branches of professional science and practice, and to guarantee their bearer's qualifications equally in all; others express that their bearers have been examined in but one branch of practice with the connected science, and are guaranteed for that branch only; and, while there is this material difference

* Examination in *practice* tests how far the candidate may properly at the moment be allowed to commence applying for the treatment of disease the actual recognized resources of his profession; but examination in *science* more nearly represents what eventually becomes of great interest to society and to the profession, how far the candidate, if admitted, is likely to augment the useful resources of the profession.—J.S.

in their import, titles of the latter class are extensively used as though they were evidences of general professional qualification. Constitution of the Medical Profession.

Thus, for instance, it recently appeared* as the result of an examination of the titles published in the Medical Directory, that of 7,464 practitioners holding the diploma of the English College of Surgeons, and commonly known as "Surgeons," more than a fifth part (1,524) possessed no second title; and, since the English College of Surgeons examines in but one branch of practice, so, for anything which appears to the contrary, the above very considerable section of the recognized medical profession of England can offer no guarantee for its competent knowledge in the practice of medicine, or in the practice of midwifery, or in the practice of pharmacy. On the other hand, of 6,784 persons holding the license of the English Society of Apothecaries 879 (about 13 per cent.) were apparently unpossessed of any diploma to guarantee their knowledge even of the rudiments of surgery. The public is but imperfectly informed of these facts or their meaning. It is notorious that, as regards the great mass of professional practice, there can be no classification of patients to correspond with those half-qualifications of practitioners; and it would be unreasonable to doubt that, if 2,403 persons are practising with such half-qualifications, they must constantly be outstepping the limits of their recognized title to practise, and be assuming positions in which, so far as the professional title is a test, they must be classed with unqualified practitioners.

It may be accepted as quite proper that there should exist within the profession, as at present, a power by which certain Corporations of Physicians and Surgeons may award distinctive titles of honour to persons of riper age who show eminent qualifications for one or other branch of practice. But such distinctive titles ought not, it is held, to be given except as superadditions to the primary and general title

* See a paper by G. M. Stansfeld, Esq., in the "Association Medical Journal," March 29, 1856.—J.S.

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which should mark every member of the medical profession. It seems an insecure arrangement for the public, and is contrary to the usage of all countries where the medical profession is recognized at law, that candidates should receive any legal recognition as medical practitioners, founded on their exclusive knowledge of one department of medicine; that they should be admitted to professional rank as "consulting surgeons," while perhaps ignorant of the elements of physic, or to professional rank as "physicians," while perhaps ignorant of the elements of surgery. If legal status is to be given to the medical practitioner, it ought to be on the basis that from all future candidates there will be exacted, first of all, the knowledge which would render them (according to the minimum standard of a pass-examination) competent for general practice; and that Corporations of Physicians and Surgeons, in giving distinctive titles to those whom they wish to designate as fit for the consulting departments of medical and surgical practice, will confer such titles only on persons who have previously passed through the "one portal."

3. Of existing medical titles those which possess any value at law possess for the most part only a local value. The English and Irish Colleges of Physicians and of Surgeons cannot enable their members to practise within the territory of the Scotch medical corporations; the physician of Edinburgh or London may not prescribe in Dublin; the Scotch or Irish general practitioner may not act as an apothecary in England; the English apothecary may not act as such in Ireland; physicians may be lawfully practising even in Manchester, or Liverpool, or Oxford, or Cambridge, whom the law considers disqualified from practising in London; and there are eminent practitioners in Edinburgh and Glasgow who could not legally extend their practice from the one city to the other.

It seems too obvious to require argument, that public confidence cannot reasonably be claimed for any such system as this; and that if the medical profession is to obtain recognition from the Legislature, those exclusive jurisdictions

must give way to a system under which the "legally "qualified medical practitioner," subject only to such restrictions as may be requisite for the internal government of the profession, shall be entitled to practise, according to the nature of his qualification, in every part of the United Kingdom. Constitution of the Medical Profession.

III. On any impartial review of the above circumstances, it must surely be acknowledged that the present system of admission to the medical profession does not give the public sufficient security for the attainments of the persons admitted. And in any hoped-for settlement of the profession, the task of providing this security can never be left to the mutually independent actions of twenty-one irresponsible authorities. If the long-vexed question of Medical Reform is ever to be set at rest, and if the medical practitioner is to be more distinctly than at present recognizable at law, and if the general tone of the profession is to be raised by the co-operation of powers which now too often only conflict with each other, assuredly these results can only come to pass by the existing authorities consenting to merge some share of their present independence in a general government of the profession. They, indeed, have a right to hope that this independence shall not be interfered with beyond the real necessities of the case; but the public and the profession have an equal right to expect that the power of independent action, vested of old in each institution, shall be regarded as a trust for the common good, and shall be found ready to subject itself to limitation such as changed circumstances may have rendered necessary.

1. It appears to be generally admitted that the principle of government by a Professional Council is the only one which promises to fulfil the requisite conditions. But, obviously, if such a Council is to do good, its powers must be more than nominal; and it requires careful consideration to determine, first, by what constitution it will be rendered a proper depositary of such powers; and, secondly, what are the least powers of control which will enable it to fulfil its object.

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As regards the first question it seems indispensable, as the condition under which to vest such powers as it is proposed to vest in the Council, that the constitution of the body should render it, as completely and as evidently as possible, representative of all interests concerned.

Fortunately it appeared in last year's discussions of the subject that a very large majority of the examining institutions of the United Kingdom were ready to accept the Council proposed in Mr. Headlam's (second) Bill, as fulfilling their conception of a representative Council. Mr. Headlam's proposal in respect of the Council is, therefore, taken as a basis for the present plan, reserving only a margin for such modifications in detail as may render the representative character of the Council still more complete.* It is hoped that under this constitution the power of the Council would not be an object of jealousy.

On the one hand, as regards those examining institutions which have formally expressed their desire to see such a Council established, they cannot reasonably object to investing the Council with sufficient power of control in relation to their common objects; nor, if those institutions are satisfied that the proposed balance of representation is tolerably just, can they reasonably shrink from accepting the arbitration of the Council in matters where their respective interests may be mutually discordant, or may require to be harmonized with the new system of admission to the medical profession.

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* The points on which it appears that questions may arise are chiefly the following:—1st, whether the Apothecaries' Company of Ireland can reasonably expect to send a representative to the Council—it being incontestable that the Company, under its Act of Incorporation, is constituted solely for the purpose of examining and licensing druggists, and that any action taken by it as a body for granting certificates of medical qualification has been in excess of its legal powers; 2ndly, whether the distribution of representatives among the several medical institutions of Scotland is as equitable an one as could be desired; 3rdly, whether the University of Durham, which in 1855 returned to the House of Commons that it had never yet held any examination for medical degrees, can be considered as having a *bonâ fide* interest in medical matters, and a claim to be represented in the Council; 4thly, whether the choice of the Crown in respect of the section of Council which it is to nominate ought to be restricted, or ought not, rather, to be left as a simple responsibility to choose the person whom it may judge best qualified to perform the duties of Councillor.—J.S.

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On the other hand it is of great importance that the general profession and the public should recognize, in the constitution of the Council, that its object is not exclusively to guard the vested rights of corporate institutions. A certain proportion of independent members is the best security that those peculiar interests shall not be too partially considered; and persons who demand this security will be satisfied, it appears, with Mr. Headlam's proposal that, while seventeen members of Council are to be delegated by different Universities and medical corporations, six members shall be appointed by the Crown.

2. Yet further, as it is of paramount importance to the success of the measure that the powers of the Council in matters of detail should be left, as far as may be, unfettered by minute provisions of law, it is proposed, as the utmost security against any possible abuse of those powers, that they should not be exercised without some sort of responsibility to Parliament. It is proposed, namely, that all important Acts of the Council shall require confirmation by Her Majesty; that a month's public notice shall be given of any Order for which it is intended to ask this confirmation; and that thus every opportunity shall be given, in cases of difference of opinion, for a minority of the Council to appeal to the Privy Council against any course of proceeding which it may consider objectionable. The proceedings of the Council, through the Minister who would be responsible for sanctioning them, would thus become subject to criticism in Parliament.

Under this arrangement, however large might be the powers of the Council, every institution affected by the law might feel secure that its individual rights would be duly respected; and the public also might know that those regulations, under which the future medical profession would be qualified and organized, could be only such as would likewise conduce to the interests of the general community.

3. If the principle be admitted, that a Council constituted on the proposed plan may be trusted with large discretionary powers, it will be unnecessary to touch by direct enactment any one of the existing Boards, except where the certificates

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of such Boards are to be used as legal warranty of qualifications to practice. So far as the Membership or Fellowship of any College, Company, or Faculty, or the Baccalaureat or Doctorate of any University, is desired as a title of honour, so far the law needs not in any manner interfere with the terms on which the title is granted. In this point of view, every Board might continue to examine as it now examines, to take fees as it now takes fees, and to give titles as it now gives titles. Even the exclusive jurisdictions of the different medical corporations might be left as they now stand, against persons who should not be registered under the new law. The essential reservation would be this: that so far as any medical diploma or certificate should be sought in order to its constituting a legal title to public privileges and immunities, so far the conditions of its granting should be subject to the approval of the Council.

The future candidate for legal recognition as a "qualified "medical practitioner" must have attained a certain standard of knowledge; and his attainment of this standard must have been tested by a certain sufficient examination. The Council must have power to fix the standard, and to ensure that the test be applied. Powers below this necessity would be delusive; powers above it would be superfluous.

4. The arrangement which is proposed for these purposes is the following:—*first*, that all the present legally-constituted Examining Boards of the three divisions of the United Kingdom should be enacted to be the Examining Authority under the new law, and that, at any examination conducted by that authority for the purposes of the Act, the Council, and any member or deputy of the Council, should be entitled to be present:—*next*, that power should be given to the Council to make, after due public notice, and with the approval of Her Majesty in Privy Council, orders and regulations as follows:—

> fixing, in respect of age, study, knowledge, and examination, the conditions under which the future candidate shall be admissible to the medical profession as a "qualified "medical practitioner;"

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determining, in respect of the several Examining Boards of the United Kingdom what share may be fulfilled by the certificate of each of them acting separately, or by the certificate of two or more of them acting conjointly, as contributory to the total certification which shall give admission to the register;

disallowing the future certificates of any Board which shall have conducted its examinations inefficiently or irregularly;

establishing, or causing to be established, an examination in particular branches of knowledge, general or professional, where arrangements for such examination shall not have been otherwise sufficiently provided.

It seems certain that, under these arrangements, the Council would be able to provide against the evils which are now alleged to exist in the system over which the Council would be appointed to watch. The present minute subdivision of the examining authority, the fragmentary nature of many diplomas, certificates, and licenses on which the candidate is admitted to practise, the tendency of irresponsible competition among Examining Boards constituted and paid on principles not favourable to strictness of examination—these are influences which the Council could estimate at their due weight, and, in case of need, could counteract by appropriate regulations. Under this supervision there might be ensured such uniformity of minimum qualification throughout the United Kingdom that the recognized medical practitioner of one part might properly claim the right of practising in any other part.

5. The Council must, from the nature of the case, be responsible for the proper keeping and publication of the Register; and as some difference of opinion appears to prevail as to the form in which the register should be kept, it is proposed that this matter should be determined by an Order of the Council, subject, like its other Orders and Regulations, to confirmation by Her Majesty in Privy Council; and that the Council should be enabled to provide in such Order for the keeping of separate registers of persons with special qualifica-

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tions, and thus to distinguish, as may be seen fit, the Bachelors and Doctors of Medicine of Universities, the Licentiates and Fellows of Colleges of Physicians, the Members and Fellows of Colleges of Surgeons, and so forth; also that such Order should provide for the payment by admitted candidates of whatever registration fees shall be deemed proper.

6. Provision being made for the publication of an authentic register of examined and approved practitioners, with such distinction of their respective qualifications as may be judged necessary for the object of the publication; and security being taken, so far as circumstances render practicable, that the names of none but well-qualified persons shall hereafter be added to the register, it becomes reasonable to claim for registered practitioners the privileges mentioned in the first part of this Memorandum, that they alone should constitute the medical profession in its legal sense, and that none but they should be competent to hold any public medical appointment, or do any public medical act, or recover payment for any alleged medical services. And since the public esteem in which a profession is held must depend on the moral character of its members, not less than on their technical attainments, it is fully consonant with the proposed object that the Council should be empowered to remove from the register the name of any person convicted of crime, or guilty, in his professional capacity, of immoral and disgraceful conduct.

IV. Legislation, to the extent thus far suggested, appears capable of realizing objects which, estimated either by a professional or by a social standard of importance, may fairly be considered the most important ends of medical reform; but many persons have thought that legislation should go further than this, and should not stop short of defining all differences of rank and department which exist within the pale of the profession. If the intention be that differences of rank and department, so far as they are at present described by the titles of various graduates, licentiates, members, and fellows of Universities and Medical Corporations, should be recognized in the register, it may be observed that this is

already provided for in the arrangements proposed. To the general register will be appended such special registers as the Order in Council shall determine. In the general register the member or licentiate of a College of Surgeons can be distinguished from the Fellow of a like College; the licentiate of a College of Physicians from the Doctor or Bachelor of an University, and so forth. In the special registers, graduates, and licentiates, and members, and Fellows of Universities and Medical Corporations, can be classed under heads corresponding to the various institutions from which their titles are derived, and to their rank in such institutions respectively. Every existing difference of title can thus be marked; and surely if a professional Council is to be constituted for any useful purpose, it cannot be requisite that the Imperial Legislature should settle for such a Council the manner in which to keep its lists of medical practitioners. If, on the other hand, it be intended that means be taken to distinguish more exactly than is yet done, in law or practice, the differences of professional class and privilege which may be claimed by the present holders of different titles respectively, it must be objected that this course, as regards existing members of the profession, would involve great embarrassment with little proportionate advantage. The public has no real difficulty in discovering who are the general practitioners of the profession, and who are the consulting practitioners, or in distinguishing among the latter class who are physicians and who are surgeons for consultation; but it would be a task of extraordinary difficulty under the present circumstances of the profession, to define each of those three classes in the strict language of legislation; and, if the existing profession, with its very great variety of half-legal and half conventional distinctions, had by law to be divided on the basis of that three-fold classification, there would be risk both of doing injustice within the profession itself, and also of misleading the public.

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With respect to persons hereafter entering the profession, it will, no doubt, be desirable that the law should discriminate, on the one hand, the great mass of candidates who will seek

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to be registered with no more than the minimum qualification entitling them to that privilege; and, on the other hand, those whose more lengthened studies and higher attainments shall fit them to be designated as first-class practitioners in medicine, or in surgery, or in midwifery. Such a distinction of ranks can hardly fail to be of public advantage. By the prospect of attaining distinctive titles of honour with correlative professional rank, persons entering on a medical career may be powerfully induced to extend their education and increase their means of usefulness. But this object would be frustrated, and, so far as the public is concerned, the distinction of higher and lower titles would be valueless, if the higher rank could be attained on any other ground than that of higher professional excellence; and it would therefore be hazardous to propose legislation on this part of the subject unless Parliament were prepared either to decide as to the relative value of all medical titles of honour, or to submit the award of all such titles to the supervision of the Council, in a manner which could hardly be acceptable to the various institutions which grant them.

It accordingly seems that legislation in this part of the subject may properly be postponed. A first act of legislation will have attained very important results if it succeeds in giving a legal boundary to the medical profession, in fixing the general privileges of its members, in providing for the sufficient qualification of persons hereafter entering its rank, and in removing from the competent practitioner those local prohibitions of which at present he complains. If the internal distinctions of the profession require to be regulated by law more precisely than is now done by the titles of the different examining bodies, this may properly become the object of a second act of legislation; and if the plan now suggested were made the basis of a first measure, Her Majesty's Government, in considering the necessity for further legislation, would be assisted by the deliberations of the Council which this first measure proposes to constitute.

THE MEDICAL ACT OF 1858.

Clause IV. of Mr. Cowper's Medical Practitioners Bill.

The Medical Act of 1858.

The General Council of Medical Education and Registration of the United Kingdom, herein-after called the General Council, shall make orders and regulations in relation to the matters herein-after mentioned, as soon as conveniently may be after the commencement of this Act, and may from time to time repeal or alter any such orders or regulations, and make new orders or regulations in addition to or in substitution for all or any of the orders or regulations for the time being in force, but no such orders, regulations, repeals, or alterations shall have force until approved by Her Majesty in Council; and notice of the time when it shall please Her Majesty that any such orders or regulations, repeals or alterations as aforesaid, be taken into consideration by Her Privy Council, shall be published in the London Gazette one month at least before such appointed time.

The following are the matters in relation to which such orders and regulations shall be made; (that is to say,)

Establishing a register or registers of medical practitioners qualified to practise under this Act, and any separate register or registers, if the General Council shall so think fit, of persons having degrees, diplomas, or special titles in medicine or surgery in addition to their authority to practise under this Act, and for adding such degrees, diplomas, and special titles to the general register of persons entitled to practise, and the form and manner in which such register or several registers shall be kept.

Defining the qualifications and conditions in respect of general and professional knowledge and course of study, and in respect of age and otherwise, which shall entitle persons (others than such as may be entitled in respect of qualifications existing before the 1st day of December 1858) to be registered, and what degrees, diplomas, certificates of examining bodies, or other testimonials, shall be required or admitted as evidence of such qualifications, or of the compliance with such conditions.

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And for the purpose aforesaid the orders or regulations may require that two or more of the examining bodies in any part of the United Kingdom shall co-operate in conducting a required examination and in certifying in relation thereto.

The General Council may if they think fit, by their orders or regulations approved as aforesaid, establish or provide for establishing examiners in any one or more of the branches of knowledge in which persons desirous of being registered must be qualified, in any part of the United Kingdom where examination in such branch or branches of knowledge is not otherwise provided for to the satisfaction of the General Council.

The General Council shall by their orders and regulations approved as aforesaid fix a fee to be paid on the registration of every person becoming entitled to be registered under the orders and regulations, such fee to be paid by the examining body by which the evidence entitling such person to be registered may be transmitted to the registrar.

Sections XVIII. to XXII. of the Medical Act, 1858.

XVIII. The several colleges and bodies in the United Kingdom, mentioned in Schedule (A.) to this Act, shall from time to time, when required by the General Council, furnish such Council with such information as they may require as to the courses of study and examinations to be gone through in order to obtain the respective qualifications mentioned in Schedule (A.) to this Act, and the ages at which such courses of study and examination are required to be gone through, and such qualifications are conferred, and generally as to the requisites for obtaining such qualifications; and any member or members of the General Council, or any person or persons deputed for this purpose by such Council, or by any branch council, may attend and be present at any such examinations.

XIX. Any two or more of the colleges and bodies in the United Kingdom mentioned in Schedule (A.) to this Act may, with the sanction and under the directions of the

General Council, unite or co-operate in conducting the examinations required for qualifications to be registered under this Act.

XX. In case it appear to the General Council that the course of study and examinations to be gone through in order to obtain any such qualification from any such college or body are not such as to secure the possession by persons obtaining such qualification of the requisite knowledge and skill for the efficient practice of their profession, it shall be lawful for such General Council to represent the same to Her Majesty's most honourable Privy Council.

XXI. It shall be lawful for the Privy Council, upon any such representation as aforesaid, if it see fit, to order that any qualification granted by such college or body, after such time as may be mentioned in the order, shall not confer any right to be registered under this Act: Provided always, that it shall be lawful for Her Majesty, with the advice of Her Privy Council, when it is made to appear to Her, upon further representation from the General Council or otherwise, that such college or body has made effectual provision, to the satisfaction of such General Council, for the improvement of such course of study or examinations, or the mode of conducting such examinations, to revoke any such order.

XXII. After the time mentioned in this behalf in any such Order in Council, no person shall be entitled to be registered under this Act in respect of any such qualification as in such order mentioned, granted by the college or body to which such order relates, after the time therein mentioned, and the revocation of any such order shall not entitle any person to be registered in respect of any qualification granted before such revocation.

THE OPERATION OF THE MEDICAL ACT.

From the Twelfth Report to the Privy Council, 1869.

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Under the so-called "Medical Act" of 1858, which regulates for the United Kingdom the system of legal qualifications for practice in the Medical Profession, all responsibilities assigned to Her Majesty's Government for the purposes of the Act are vested in the Lords of the Council; and even apart from the special relation so constituted, my Lords, in their general relation to the health-interests of the country, would of course feel that questions concerning the efficiency of the Medical Profession are among the most important which could possibly claim their attention in this department. It was with this feeling that my Lords, in 1869, received from the General Council of Medical Registration and Education (the body which administers the Medical Act) a request that their Lordships would promote in Parliament certain amendments in the present law. The particular amendments which the Medical Council in the first instance had in view concerned only minor points in the law; but my Lords, considering that the Medical Act had now been more than ten years in operation, and that consequently a fair judgment might be formed whether the more essential provisions of the Act had been successful, directed the attention of the Medical Council to this larger aspect of the case. My Lords had been advised that, though no doubt the Medical Act (especially in so far as the supervision of the General Medical Council has induced individual examining boards to make their examinations stricter and more complete) has in some respects considerably improved medical education, and heightened the average standard of qualification for persons entering on the medical profession, there yet remain in our system of admissions to the profession very serious and radical defects, which under the present Act cannot be effectually dealt with; that, by reason of these defects, the public is largely without the security which it ought to have against the admission of incompetent persons on to the Register of legally-qualified medical practitioners; and that the circumstances under

which the Act is thus in great part insufficient for its professed public purpose are not such as any minor changes of the law can in any degree affect. My Lords, after conferring with the Medical Council on this view of the case, were satisfied of its substantial justice, and that they could not propose to Parliament to amend the Medical Act unless their proposals should extend to making considerable changes in its fundamental provisions. Their Lordships' communications with the Medical Council on the above subject were not completed before the end of the year 1869; but though the completion belongs to a somewhat later date than that where (strictly speaking) my present report ought to stop, I may be permitted to state, as the total result of these communications down to the date of my report, that my Lords have had the satisfaction of finding the Medical Council entirely in agreement with them as to the need for comprehensive amendments in the present system of admission to the medical profession, and substantially as to the kind of legislation which may best be proposed for this purpose. Constitution of the Medical Profession.

The Act of 1858 was a first legislative endeavour to provide generally for the qualifications of persons entering the Medical Profession. It was of course essentially tentative. And for anyone who would now fully appreciate the nature of the questions which a re-consideration of the Act must involve, probably the simplest course is to start from the point of view in which the promoters of that tentative measure saw the exigencies of the original case. The Bill on which the Medical Act was founded was prepared under directions of the President of the then General Board of Health; of which Board I was at the time Medical Officer; and, as it was my duty, under the same directions, to prepare an office-memorandum explanatory of its point of view and intentions, I cannot do better for my present purpose than refer to that original memorandum.* The Bill, as first

* I ought perhaps to note that the Bill, though prepared as a Government measure, and at last passed as such, was, from accidental circumstances, not actually introduced as such in the House of Commons. For, at the moment when the President of the Board of Health, Mr. Cowper, was about to introduce it, a change of Government occurred; and, as there was uncertainty whether the

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introduced to Parliament, would have vested in the Medical Council ample initiative powers to regulate all conditions, in respect of general and professional knowledge and course of study, and in respect of age and otherwise, which should in future be obligatory on candidates for the medical profession; and the Council not only would have had authority to determine how far any diplomas or degrees, or other testimonials of examining boards, should be admissible as evidence of the candidates having fulfilled such conditions, but also would have been authorised to require of individual examining boards that they should combine with one another to conduct the necessary examinations. During the progress of the Bill, however, representations against these parts of it were made on behalf of some of the examining boards, and in deference to these representations the provisions were essentially changed. No doubt everyone saw that the law must of necessity be ineffective unless the final object of these provisions were, somehow or other, attained; but not unnaturally, while the working of the proposed Medical Council was hitherto quite untried, there was fear of investing the new body with too large initiative powers; and it was urged that, for the final object in view, other sorts of provision would be sufficient. The Bill was accordingly modified in the sense of this argument; so that no powers of general regulation were to be given to the Medical Council, nor any power to require co-operation of licensing boards; but so that the success of the law for its most important objects was made contingent on the willingness of the separate bodies to give effect to permissive clauses, by acting in voluntary concert or combination to regulate all conditions of candidature, and to conduct all required examinations. Sections 18–22 of the Medical Act contain the altered provisions which were thus enacted. And for convenience of comparison I refer to the original fourth clause of the Medical Practitioners' Bill, as well

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new Government could deal with the matter in that somewhat advanced session, Mr. Cowper (acting as private member) introduced the bill. Subsequently the new Government adopted it in the modified form which my text describes, and Mr. Walpole carried it through its final stages in the House of Commons.—J.S.

as the just cited sections of the Act of 1858, which are printed above. Constitution of the Medical Profession.

It is evident that the parts of the Act to which this comparison refers—parts where, except in relation to certain very extreme cases, the Act is only permissive, are parts the most critically important. Indeed, as regards the interests of the public in the efficiency of the medical profession, those are the vital parts of the Act. And when my Lords had their attention drawn to the general question of the working of the Act, the inquiry which above all they had to make was, whether, under the influence of those parts, medical education, and the conditions and tests of minimum-qualification for admission to the medical profession, had developed into a satisfactory uniform system. My Lords, as I have stated, were advised that this had not been the case; that the evils of system which existed in 1858 were existing without material abatement in 1869. Having regard to what is the essence of our present system—that the responsibility of granting entrance to the ranks of the medical profession is assigned as a divisible privilege (incidentally of a very lucrative kind) to nineteen mutually independent and consequently competing corporations, each with liberty but imperfectly restricted to fix the conditions and apply the tests on which its own license shall be granted, I think there could not from the first have been much likelihood that thorough reform of the system would be effected under the Act of 1858. No doubt the bad results which attach to the system might have been much abated if all the examining boards had made vigorous and disinterested use of their powers under section 19 of the Act: but it must be remembered that such a course of action, besides that it would have involved a limitation in certain respects on the autonomy of the particular institutions, would also in various cases have raised questions of personal or institutional loss of income; and that a mere legal permission to persons or institutions to do certain acts of self-sacrifice may very naturally be understood to imply, in the judgment of the Legislature, the absence of much public reason for the sacrifice. It is certain moreover that, as the law stands, the dissent of

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any one much-frequented examining board would have sufficed more or less to frustrate, in relation to public interests, the reformatory efforts of all other boards in the same division, if not also in other divisions, of the United Kingdom; and I even think it doubtful whether, if all boards had conspired with thorough earnestness to attempt proper co-operation under section 19 of the Act, the object could have been fully attained without some additional legislation.

Be that as it may, the correspondence which took place between my Lords and the Medical Council on the working of the present Act, and of which all main parts are inserted in the Appendix to my Report, shows, as the actual state of things, beyond any possibility of doubt, that, after eleven years' experience of the Act in its present form, and notwithstanding whatever advantages it may have offered for voluntary amendments of plan, our old multiple system retains its fragmentary and competitive method of working, still directs medical education by the unharmonised rules and standards of nineteen different regulative bodies, and still involves, in relation to the public, substantially the same insecurities as were described in my Memorandum of 1858.

My Lords, in view of this state of the case, have determined to propose to Parliament a bill for the radical amendment of the Medical Act: an amendment which should have two main objects: one, that the many authorities which at present confer license for professional practice shall for the future only confer such license by acting conjointly with one another, in their respective divisions of the United Kingdom, under co-ordination and effective supervision by the General Medical Council; and the other, that in future no license shall be given for professional practice which does not imply (to the required minimum amount) qualifications both for medicine and for surgery.

Correspondence with the General Medical Council.

(*a.*) Letter to the President of the General Council of Medical Registration and Education.

Medical Department of the Privy Council Office,
May 14, 1869.

Sir,

With reference to the draft Bill which you recently brought under the Lord President's notice, as proposed by the General Council of Medical Education and Registration, for amendment of the Medical Act, 1858, his Lordship directs me to inform you that, with every wish to assist the Medical Council in accomplishing its important duties, he does not feel that he could undertake to bring the proposals of the draft Bill separately before Parliament, as a measure recommended by the Government, unless he regarded them as covering all the ground where amendment of the Medical Act is wanted. For, considering that the Act has at present been more than ten years in operation, the Lord President presumes that a fair judgment can now be formed on its success and merits as a whole; and he thinks that a judgment of this more comprehensive sort must be the basis of any amending Bill to be introduced on the part of the Government. The Lord President would be glad to have the fullest possible explanations with the General Council on this larger aspect of the case; and, though the requisite consideration could not be given to the subject in time for legislation in the present far advanced session of Parliament, his Lordship would hope to be able to deal with it next year in the light of such information as he may meanwhile receive.

On the present occasion the Lord President does not propose to enter minutely on the question of the working of the Medical Act; but there is one point which his Lordship would wish to bring specially under your attention. His Lordship is advised that the Act is seriously defective, as not providing for a satisfactory and uniform minimum standard of admissibility to the Medical Register, and as not enabling the General Council to issue regulations in this respect. The state of the law in the United Kingdom (unlike that which obtains generally in Europe in the same matter) allows a minimum qualification in surgery to be registered without any qualification in medicine, and similarly a minimum qualification in medicine to be registered without any qualification in surgery; and so far as may be judged from a recently published analysis of titles contained in the Medical Register, it would seem that persons practising on those half-qualifications are to be counted by thousands in the United Kingdom. Cases are not infrequently brought under his Lordship's official notice, where persons, possessing only such half-qualifications, undertake nevertheless to act in all departments of professional practice, and even obtain engagement as salaried attendants on the sick poor in relation to whatever diseases or injuries may affect them. The Lord President regards this state of things as open to serious objection, and his Lordship doubts whether Government could sanction any amendment of the Medical Act which should leave so great an existing evil undealt with. The Lord President is, of course, aware that at the present time most of the examining boards which confer half qualifications, voluntarily extend their examinations beyond the limits of their titular qualification; but his Lordship doubts whether that mode of action, at its best, can supply more than a very imperfect substitute for complete legal qualification, and whether, if it were

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universal and permanent, it would not itself tend to develop considerable new difficulties.

The Lord President understands that the General Council will now very shortly enter upon its annual session in London, and he accordingly directs me to suggest that perhaps you would bring the above branch of the subject under the particular consideration of the Council, with a view to his being favoured with any recommendation which the Council may be disposed to make in regard of it.

His Lordship further directs me to suggest that the same opportunity would be favourable for eliciting the opinion of members of the Council whether, if new legislation is to take place, it would be desirable to change, in any respect, the constitution of Council which the Act of 1858 established.

I have the honor to be, Sir,

Your obedient servant,

JOHN SIMON.

[Here follows a letter in answer from the President of the Medical Council, and an extract from a report of a Committee of the Medical Council, in which the Medical Council expresses its agreement with the Lord President in considering that the Act is seriously defective, in that it allows a minimum qualification in Surgery to be registered without any qualification in Medicine, and similarly a minimum qualification in Medicine, without any qualification in Surgery.—ED.]

(*e.*) LETTER to the PRESIDENT of the GENERAL MEDICAL COUNCIL.

Medical Department of the Privy Council Office,
February 2nd, 1870.

SIR,

I AM directed by the Lord President of Her Majesty's Council to state to you that, since his recent interview with the Executive Committee of the General Medical Council, and with the assistance of such information as you were then good enough to lay before him, he has given further and most careful consideration to the question of an amendment of the laws relating to the medical profession.

The Lord President, as you are aware from the letter which by his Lordship's direction I had the honour of addressing to your official predecessor, Dr. Burrows, on the 14th of May last, would have the greatest pleasure in finding himself able to co-operate with your Council in any course tending to promote the development of the medical profession, but could not on the part of Her Majesty's Government, bring before Parliament any Bill purporting to be for amendment of the Medical Acts, unless he believed it substantially to cover all the ground where amendment of those Acts is called for, and likely in consequence to be for some time a settlement in that branch of legislation.

Now, the Lord President's further consideration of the system under which candidates are at present admitted to legal qualification for practice, has greatly increased the misgivings with which his Lordship expressed himself on that subject in his former communication to your Council; and the Lord President thinks it certain that no new legislation could have in it a fair prospect of

permanence, or could, even for the time, be satisfactory to the profession and the public, unless it effected, or promised to effect, some very considerable improvement in that system.

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That examinations for admission to the Medical Register are held by many mutually independent and in great part competing corporations, and that each examining board has its own separate set of conditions for admitting candidates to examination, is the system which now exists under supervision by your General Council; and whereas the Lord President's former communication adverted to some of the evils which are prevailing under that system, other evils incidental to it, and the obstacles which in the present state of the law delay such evils from being remedied, are abundantly shown in papers which you have communicated to his Lordship, and in other representations which have reached him.

The Lord President doubts whether the present system, under any practicable kind of supervision, can either work satisfactorily for medical education, or can provide adequate and uniform security for those great public interests which are concerned in the efficiency of the medical profession.

His Lordship is persuaded that doubts like these could not fail to be pressed in any parliamentary discussion of the Medical Acts; doubts, particularly, whether the conditions under which candidates are admitted to examination with a view to minimum-qualification for practice ought not to be expressed in a single code of regulations common to all examining boards of the United Kingdom; and whether, similarly, a more or less consolidated examining authority ought not to be substituted for the many separate examining boards which now act under your General Council in giving admission to the Medical Register.

The Lord President believes that opinions adverse to the present system are very generally entertained in the body of the medical profession by persons who may be regarded as competent and impartial observers; and that some of the most important public bodies concerned with the constitution of the profession have recorded resolutions in a like sense, and are even endeavouring to amend the working of the system by voluntary arrangements with one another.

The report, moreover, which you brought under the Lord President's notice, as recently made to your Council by a Committee specially appointed to consider the subject of Medical Education, expresses itself in terms so unqualified as to an urgent necessity for consolidation of examining authorities, and as to the general grounds on which that necessity rests, that the Lord President regards this question as presumably ripe for decision.

The recommendation of that Education Committee of your Council is, that "leaving to the universities and corporations full liberty to deal as they please "with their honorary distinctions and degrees, the Medical Council should "endeavour to effect such combinations of the licensing bodies included in "schedule (A.) as may form a conjoint examining board for each division of "the Kingdom, before which every person who desires a licence to practice "should appear, and by whom he should be examined in all subjects;" and your Executive Committee (referring to the possibility that such consolidations might not be adopted on mere recommendation) represents to the Lord President that "in the opinion of many members of the Council the Medical Act is deficient "in not granting compulsory power to effect such amalgamations of examining "boards as may seem desirable."

Accordingly, in view of all the circumstances, the Lord President would not be willing to submit to Parliament any proposals for amending the Medical Act in such minor respects as were touched by the Council's draft Bill of last Session,

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unless he were, at the same time, in a position to propose larger improvements in the present system; but if it be the wish of your Council that legislation in this larger sense should be asked for, particularly such legislation as your Executive Committee seems to have in view, the Lord President would hope to be able to propose to Parliament a Bill to give effect to such intentions.

The Lord President therefore directs me to request that you will have the goodness to take the sense of the Council on this question. And I am also to state to you that his Lordship would have little hope of carrying any measure in this next session of Parliament, unless he were enabled to introduce it without any considerable delay.

I am, &c.

JOHN SIMON.

(*f.*) LETTER from the PRESIDENT of the GENERAL MEDICAL COUNCIL.

General Council of Medical Education and Registration,
32, Soho Square, London, W., 1st March 1870.

SIR,

I BEG leave to acquaint you, for the information of the Lord President of Her Majesty's Council, that your letter of the 2nd February, written by direction of his Lordship, the receipt of which I have already acknowledged, seemed to me to deal with matters of so much importance, and to require so early a reply, that I thought it advisable to summon without delay a meeting of the General Medical Council for its consideration.

The General Medical Council desires me to express the great satisfaction with which it received the intimation conveyed in your letter, that the Lord President would hope to propose to Parliament a measure for amending the Medical Act, which should remedy not only such defects as were touched on by the Medical Council's Draft Bill of last session, but effect much larger and more important improvements in the system under which persons now receive licences to exercise the profession of medicine.

In addition to former communications from the Medical Council relative to the matters requiring legislation in any new Medical Act, I now beg to forward for the information of the Lord President, copies of resolutions agreed to by the Medical Council at its meetings on the 26th and 28th February 1870, when your letter was brought under its consideration.

You will see from these resolutions that the Medical Council agrees with the Lord President in thinking that the present system of medical examination entitling to registration requires amendment, and that the Council considers that some more or less consolidated examining authority should be instituted.

The Council has decided that this may be best accomplished by the formation of a conjoint examining board in each division of the kingdom, such board being constituted by a combination of the present licensing bodies on a plan to be hereafter determined.

The Council believe that arrangements may be thus made, which, with the least injury to existing institutions, will ensure that the examination for license to practise shall be in every respect complete and trustworthy.

The Council has appointed its executive committee to confer with the Lord President, and to bring before him, for his consideration, the various provisions which it would be necessary to introduce into an amended Act, in order to carry out the objects stated in this and former communications from the Council.

I have only further to acquaint you, that the executive committee will be prepared to attend upon his Lordship at any time that he may appoint. Correspondence with the General Medical Council.

I have, &c.
(Signed) GEORGE EDWARD PAGET, M.D.,
President of the General Medical Council.

John Simon, Esq., F.R.S.,
Medical Officer to the Privy Council.

Resolutions agreed to by the Medical Council at its Meetings on the 26th and 28th of February and 1st March 1870.

Resolutions agreed to by the Medical Council.

"That this Council is of opinion that a joint examining board should be formed in each of the three divisions of the kingdom, and that every person who desires to be registered under any of the qualifications recognized in schedule (A.) to the Medical Act shall be required, previously to such registration, to appear before one of these boards, and be examined on all the subjects which may be deemed advisable by the Medical Council; the rights and privileges of the universities and corporations being left in all other respects the same as at present."

"That in accordance with the foregoing resolution (minutes for February 25, 1870, section 2), the universities and medical corporations established in each division of the United Kingdom shall be requested to concert a scheme for the constitution and regulation of a conjoint examining board for that part of the kingdom to which they belong, and shall on or before June 1, 1870, transmit such scheme to the consideration of the General Medical Council."

"That any alterations in the aforesaid schemes, deemed necessary by the Council, should be considered by the conjoint bodies, and their opinion reported to the Council; and that, in case of disagreement between any of the conjoint bodies and the Council, the points of difference should be referred to the consideration and decision of Her Majesty's Privy Council. That the same course should be followed if in process of time it should be considered advisable to make any alteration in the original constitution or rules of the conjoint examining boards."

"That the powers required for carrying the foregoing resolutions into operation be sought from the Legislature; and that Her Majesty's Government be requested to bring in and carry through Parliament a Bill to amend the Medical Acts, which shall contain the requisite provisions."

"That it is the opinion of this Council that if power be granted to the Medical Council to register under certain restrictions foreign or colonial degrees or diplomas, the holders of such foreign or colonial degrees or diplomas should undergo the same examination before one of these conjoint boards which will be necessary in the case of every person who desires to register under any of the qualifications recognized under schedule (A.) of the Medical Act."

"That in any amending Medical Bill it is desirable that a clause should be inserted enabling the General Medical Council, or any of the branch councils, to establish a board or boards for the examination of intending medical students in general education."

"That in the opinion of this Council it is desirable that all medical corporations should possess the power legally exercised by some of them of striking off from their lists the name of any person registered under the Medical Act, under any of the qualifications conferred by those bodies, who shall have been convicted in England or Ireland of any felony or misdemeanor, or in Scotland of any crime or offence, or shall after due inquiry be judged by any one of those bodies, or

Resolutions agreed to by the Medical Council.

by the General Medical Council, to have been guilty of infamous conduct in any professional respect; and that a clause to this effect should be introduced into any amending Medical Act."

THE MEDICAL ACTS AMENDMENT BILL.

From the Thirteenth Report to the Privy Council, 1870.

Constitution of the Medical Profession.

In my last report I described in detail certain communications which this department had had with the *General Council of Medical Registration and Education* on the subject of the working of the Medical Act of 1858, and stated the determination to which your Lordships, at the date when I was reporting, had come, to propose to Parliament a Bill for the radical amendment of the Medical Act. Proceedings connected with this purpose formed in 1870 a large share of the work of the department. On the 8th of April the Lord President introduced in the House of Lords a Bill to provide for the object in view: and on the 7th of July this Bill, somewhat modified, but with no essential change, as the result of its discussion in the House of Lords, had its first reading in the House of Commons. Here, unfortunately, there was such pressure of other public business that the Bill could not till long afterwards be brought under consideration; and when at last its turn for consideration had arrived, the end of the session was so close that no measure requiring much discussion could be considered. In this state of the case claims were put forward for the introduction of a new and very controversial subject-matter into the Bill; and as the promoters of those claims (which related to the constitution of the General Medical Council) would not consent to postpone them for consideration to the present session of Parliament, the Minister in charge of the Bill was of course obliged to withdraw it.

I subjoin as an Appendix the following papers:—a departmental memorandum, written at the time in explanation of the Lord President's Bill, and now supplemented by a note on each of the two chief questions which were discussed while

the Bill was in progress; and a tabular statement as to the constituencies which are at present represented by delegates in the Medical Council.

Memorandum on the Lord President's Medical Acts Amendment Bill of 1870.

Memorandum on the Lord President's Bill of 1870.

The Bill has two main objects*:—one, that the many authorities which at present confer license for professional practice shall for the future only confer such license by acting conjointly with one another, in their respective divisions of the United Kingdom, under co-ordination by the General Medical Council; and the other, that in future there shall not be given any license for professional practice, which does not imply (to the required minimum amount) qualifications both for medicine and for surgery.

It is intended that the existing authorities should have every proper opportunity to effect the required consolidation by voluntary arrangements with one another; which arrangements notoriously may have to be different in the different divisions of the United Kingdom. As, however, differences of opinion or conflicting interests among the authorities may absolutely require arbitration, and as each divisional arrangement will in great part be of common public concern, and may even in certain cases require to be explained and justified in Parliament, the bill proposes —first, that the constitution of each of the new boards shall be subject to the approval of the general council, and, secondly, that doth these divisional constitutions, and also the regulations which the general council will have to establish for their common working, shall be subject to the approval of Her Majesty's Government.

As regards the question what privileges and titles shall be conferrable by the new boards, and under what sort of limitation, the bill distinguishes between that least degree of qualification which shall give admission to the medical register, and, on the other hand, those higher titles of professional honour which various of the licensing bodies have in their award. As regards the latter, the bill does not propose to interfere in any way whatever with the discretion of the individual authorities, except (if indeed this can be called an exception) that the higher titles will be awardable only to persons already members of the profession;† but, with the aim of exciting a more general ambition for the attainment of the higher titles, the bill proposes that, for each future practitioner, the general council shall have power to state such higher titles in a separate column of the register, as distinct from the practitioner's minimum qualification. With regard to the minimum qualification itself, the principle of the bill is that each of the new boards must be deemed to represent, for the division of the United Kingdom in which it acts, all separate licensing boards which have hitherto been in action there; and that, so far as relates to the privilege of giving a legal qualification for practice, thus far the old boards are to be understood as merging themselves completely in the new board, and as exercising their powers solely through it. The bill, therefore, proposes that every candidate who passes a satisfactory examination before the new board shall thereupon immediately be admitted a member of the medical profession as by law constituted. As regards the title under which this new member

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* See, below, observation i.

† See, below, observation ii.

Memorandum on the Lord President's Bill of 1870.

of the profession shall be enrolled in the medical register, regard has been had to two considerations; first, that for common popular apprehension it is highly desirable to have a minimum title which can be the same in each division of the United Kingdom; and secondly, that in the present case it is quite impossible to express in any single title the joint responsibility of the five or six or seven public bodies which will have contributed to constitute the examining board; and, on these grounds, the bill proposes that the legal title under which the new practitioner is to be registered shall be the title of "Licentiate in Medicine and "Surgery."

The proposal of the bill, that, when a candidate has satisfied his examiners, his right to be registered shall not be contingent on the further fact of his being admitted as member by some medical corporation or university, is one so intimately related to the main principles of the bill that even its form could not easily be varied. But as some of the bodies concerned, and especially some of the medical corporations, are understood to attach importance to privileges which this proposal seems to touch, some collateral proposals of the bill are intended to secure those privileges against any unnecessary interference. In the first place, as regards the financial interests concerned, the principle is accepted that the fees of persons entering the medical profession may fairly be expected, not only to pay the expenses of the divisional examining boards, and of the council and branch councils by which these boards are superintended, but also to a reasonable extent (as measured by what has heretofore been done in the same matter) to supply a surplus out of which various of the bodies may be enabled to support museums and libraries for the general professional advantage, and to promote higher professional culture in their respective departments of practice. And, in the second place, though the future licentiate will not be bound to have relations of personal enrolment with any of the former licensing bodies, the bill contains provisions specially intended to facilitate the voluntary establishment of such relations, and to give them where they shall be established the highest reasonable degree of recognition. It is proposed that the universities and medical corporations may, at their option, accept the examinations of the new boards as equivalent to any examinations which have heretofore had to be undergone by candidates for the respective minor titles of those bodies; further, as regards cases where the surplus of examination fees is allotted to particular institutions for the furtherance of professional objects, that such institutions may be required to enrol as members the licentiates who have contributed towards such fees; and, finally, that these optional relations with institutions, though not to be of any legal force beyond such as the byelaws of the particular institution would confer, may, at the desire of the institution, be noted by the general council in a special column of the medical register.

Subsequent Observations on the Bill.

Subsequent Observations on the Bill.

(i.) The fact that the Bill did not aim at the further object of altering the constitution of the General Medical Council was, from a particular point of view, objected to it as a defect. But—apart from all question whether the constitution of the Medical Council ought or ought not to be altered, and what alteration, if any, it ought to undergo, impartial persons duly informed of the circumstances, will I believe admit that the bill, as it stood, was one of extreme difficulty, by reason of the sectional interests which it affected, and that this difficulty would have been enormously aggravated, though with little prospect of equivalent advantage, if the bill had further opened the collateral and almost interminable

question of a *de novo* constitution for the Medical Council. It is true that the voices which last year were loudest for a new constitution of council were calling only for one particular sort of change; that, namely, of adding to the council a certain number of persons who should be chosen by the universal suffrage of the members of the medical profession in the United Kingdom. But there is no reason to suppose that, if this proposal had come under parliamentary notice, the change would have been accepted *sub silentio*, as, by common consent, an improvement in the present constitution of the council, or as something which, if incorporated in the Lord President's bill, might be viewed as not greatly modifying the remainder. The present construction of the council, as fixed by the Act of 1858, represents a kind of compromise between the profession and the public, arrived at with difficulty after long and renewed discussion, which, while it lasted, effectually prevented all legislation to amend the license system of the medical profession; and if that compromise were put forward for reconsideration, probably a new settlement would be scarcely less difficult than the old. The two objects at which the Lord President's bill of 1870 actually aimed were, I believe, universally admitted to be of great and urgent importance to the public; and experience suggested that the attainment of those objects might be quite indefinitely delayed if, in endeavours to compass them by legislation, the constitution of the General Medical Council must also be treated as an open question.—J.S., 1871.

Subsequent Observations on the Bill.

(ii.) Some of the universities objected to this provision that it would limit their privileges beyond the positive requirements of public safety, for that it would debar them from conferring medical degrees (which they contended might be merely titles of honour) on persons not intending to practice medicine. They insisted on retaining the independent liberty to confer, though on persons not registered under the Act, such medical degrees as they might see fit; but they were ready to accept as law that their degrees should not constitute any claim for registration, nor be a legal qualification for practice, nor even be publicly usable by the possessor (unless otherwise qualified) if practising medicine for gain. The universities which claimed this exemption had perhaps not duly considered what conflict of law and common sense it might popularly appear, that, in a country where the most illiterate and unskilled of unregistered persons are not as such prohibited from practice, a man legally holding a medical degree, given (and perhaps the highest which could be given) after examination by an university of the United Kingdom, might be under penalty for practising his profession. Nor perhaps had they fully seen how difficult it would be for courts of justice in case of need to enforce so paradoxical a law, or how probably this partial-exemption, if it were granted, would tend to perpetuate just such by-ways into the medical profession as the bill had for its main object to close. Practically, however, for reasons which need not here be entered on, there was no alternative but to yield to the wishes of the universities; and consequently *the granting* (whether by universities or by medical corporations) *of mere titles*, not giving the holder a claim to registration, was exempted from restriction by the bill.

This change was, I think, to be regretted, as making the bill logically less complete in its subject matter, and therefore less popularly intelligible, and less susceptible of successful working as law, than it aimed at being; but the damage was immeasurably overrated by persons who represented the change to be one of cardinal importance to the bill. Those who asked for the exemption I have described did not gainsay the principle of the bill, that every one seeking to be recognised at law as a medical *practitioner* must enter the profession by the common portal. And their claim for exemption was confessedly subject to the

Subsequent Observations on the Bill.

condition that no side-door into medical *practice* should be established by it. Therefore, of two alternatives, one:—either this condition would have been observed, and then the essential public object of the bill would have been attained; or else, the exemption being abused, the case for at once further ammending the law would be irresistible. At the compromise of leaving unchanged and on trial that very small fraction of our present system, all the main practical mischief of the system would have been immediately brought under control.—J.S., 1871.

Constituences represented in the Medical Council.

TABULAR STATEMENT (according to Returns made in 1870) as to the NINETEEN BODIES by which the representative MEMBERS of the GENERAL MEDICAL COUNCIL are elected.

N.B.—Each of the under-mentioned Bodies is separately represented in the Council, except that one member represents jointly the two Universities of Edinburgh and Aberdeen, and one member the two Universities of Glasgow and St. Andrew's. In addition to these 17 delegates from institutions, there are in the Council six members appointed by the Crown, and an additional member, the President, appointed by the above 23 : the total number being 24.

Bodies represented in the Medical Council.	Board or Body of Persons acting as the Body mentioned in the previous column in choosing a Person to act on behalf of the same in the General Medical Council.	Number of Members of the Electoral Board or Body.	Constituency by which the Members of the Electoral Board or Body are appointed, or other qualification giving a vote.
Royal College of Physicians, London.	"The commonalty or "fellowship of the "faculty of physic," incorporated by royal charter of Henry VIII. in 1518, confirmed by Act of Parliament, 14 & 15 Henry VIII. cap. 5.	On Feb. 26, 1870, 235 persons or fellows.	The constituency and the electoral board or body are one and the same.
Royal College of Surgeons of England.	The council of the college.	The council, when complete, consists of 24 members.	The fellows of the college, in number exceeding 1,300.
The Apothecaries' Society of London.	The master warden and assistants of the society, who are constituted the governing body of the society by the charter of incorporation granted by James I., and confirmed by Act of Parliament, 55 Geo. III. cap. 194.	24 persons - -	The members of the body are appointed by the body itself.
The University of Oxford.	The convocation of the niversity.	4,323, in 1870.	A person to be entitled to vote in convocation, must have taken the degree of Master of Arts, or of Doctor in Laws, Divinity, or Medicine.

Bodies represented in the Medical Council.	Board or Body of Persons acting as the Body mentioned in the previous column in choosing a Person to act on behalf of the same in the General Medical Council.	Number of Members of the Electoral Board or Body.	Constituency by which the Members of the Electoral Board or Body are appointed, or other qualification giving a vote.	Constituences represented in the Medical Council.
The University of Cambridge.	The senate of the university.	Of about 5,500 persons. Although all members of the senate are entitled to vote, non-residents rarely do vote at the election. There are about 280 resident members of the senate.	A member of the senate is a person who (1), has taken the degree of Master of Arts, Master of Laws or of Doctor in some faculty; (2), retains his name on the boards of some college or on the university register; and (3), has declared himself a bonâ fide member of the Church of England. Masters of surgery of *three years'* standing who have fulfilled conditions (2) and (3) are also members of the senate.	
The University of Durham.	The convocation of the university.	280 at the present time.	A person to be entitled to vote in convocation must have:— (1.) Taken a degree of D.D., D.C.L., M.D., or M.A., in the university. (2.) Continued without interruption to be a member of the university from the date of his admission to such degree. (3.) Declared in writing that he is a bonâ fide member of the United Church of England and Ireland as by law established; and (4.) Discharged the duties and payments required from him. The payments are 1*l.* annually, or, in lieu of it, a composition of 5*l.*	
The University of London.	The senate of the university.	The senate consists of 36 members, inclusive of the chancellor and vice-chancellor.	The members of the senate are nominated by the Crown, but every fourth appointment is made from a list of three persons nominated by the convocation of the university.	
The College of Physicians of Edinburgh.	The fellows of the college on the roll of attendance.	At present of 61 (Feb. 26, 1870).	By the fellows from the members of the college. No other qualification gives a vote.	
The College of Surgeons in Edinburgh.	The fellows of the college.	About 250 at present.	All fellows, except those who claim the privilege of the widows' fund, and who are examined, are elected by ballot. All fellows must have been licentiates of the Royal Colleges of Surgeons of England, Edinburgh, or Ireland, or of the Faculty of Physicians and Surgeons of Glasgow.	

Constituences represented in the Medical Council.

Bodies represented in the Medical Council.	Board or Body of Persons acting as the Body mentioned in the previous column in choosing a Person to act on behalf of the same in the General Medical Council.	Number of Members of the Electoral Board or Body.	Constituency by which the Members of the Electoral Board or Body are appointed, or other qualification giving a vote.
The Faculty of Physicians and Surgeons of Glasgow.	The fellows of the corporation.	At present (Feb. 28) 110.	The fellowship is the only qualification which gives a vote.
The University of Edinburgh, *conjointly with* The University of Aberdeen,	The senatus academicus.	34 - - - - 22 - - - - The principal - 1 Professors in arts 6 Do. law 1 Do. divinity 4 Do. medicine 10	The Crown. Board of curators. University Court. Under ordinance of Universities Commission (21 & 22 Vict. c. 83). The principal and professors are appointed for life as follows :— By the Crown 17 By the University Court 4 By a special body of electors nominated by the synod of Aberdeen and the University 1
The University of Glasgow. *conjointly with* The University of St. Andrew's.	The senate of the university. The senatus academicus of the University of St. Andrew's, which is composed of the professors of both colleges.	The principal and 25 professors. 14 - - - -	Of the 26 members, 17 are appointed by the Crown; eight are appointed by the University Court. One is appointed by the Dean of Council of the Faculty of Procurators of Glasgow. ——
The King and Queen's College of Physicians in Ireland.	The president and fellows of the college.	47 members - -	Licentiates of the college are from time to time elected fellows by the existing fellows.
The Royal College of Surgeons in Ireland.	The president, vice-president, and council of the college.	21 - - - -	Annually elected by the fellows.
The Apothecaries' Hall of Ireland.	The general court of council.	At present 35, the number being limited to 60.	The shareholders of the joint stock of the hall, who must be licentiates of the body residing in or near Dublin.
The University of Dublin.	The provost and senior fellows of University College.	Eight - - -	The fellows are elected by the provost and senior fellows after a competitive examination.
The Queen's University in Ireland.	The senate of the university.	25 members, the chancellor and 24 senators.	Two of the present senators were elected by the convocation of the university, and the rest were appointed by the Crown. Ultimately there will be six senators representing convocation, and 18 appointed by the Crown.

A REPORT WRITTEN BY REQUEST, AND ADOPTED BY THE MEDICAL TEACHERS' ASSOCIATION.

[The following report may appropriately be added to the papers relating to the Constitution of the Medical Profession. When the Association was formed in 1867 Mr. Simon was invited to be its first President, in which capacity he wrote the following report, many of the suggestions in which have been operative.—Ed.]

Medical Teachers' Association Report.

I.—The reference on which this Report is made was resolved by the Association, on March 23rd last, in the following terms:—"That it be referred to the Council to "consider the conditions of study now imposed on Candidates "for the Medical Profession in this country, and to report "to the Association, at or before the next annual meeting, "whether in their opinion any, and if any what, changes "ought to be made in those conditions; and also whether, "with a view to improving medical education, it would be "desirable to make any alterations in the present constitu-"tion and relations of the Medical Schools in London." In connection with this reference, we also received from the Association some draft Resolutions which Mr. Rivington had proposed on the subject of the medical curriculum; and likewise a Report, which had been made by a Special Committee, on the out-patient practice of Hospitals in relation to medical teaching.

II.—In responding to the reference which has been made to us, we do not propose to discuss the abstract question, whether, under very different circumstances to those which actually obtain in this country, Authorities licensing for the Medical Profession might with advantage rely exclusively on the completeness and stringency of their own examinations as tests of the competency of candidates; and might, with this reliance, leave each student altogether at liberty to

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determine for himself the conditions of time, place, and manner, under which his necessary knowledge should be acquired. We assume that in this country, under present circumstances, the principle of so-called "free studentship" could not be generally adopted; and we accept as our present basis, that every student wishing to offer himself for examination under the Medical Act in order to obtain his licence for practice must in the first instance shew that he has gone through such a course of study as will probably have qualified him for the licence. In taking this basis, however, we feel bound expressly to point out that it cannot properly be made a ground for any illusory requisitions. In proportion as Examining Boards are obliged to supplement their examinations by any kind of collateral evidence, the quality of such evidence tends to be a matter of little less public concern than the quality of the examinations themselves; and every certificate which is accepted in aid of a system of examination ought to be a certificate either of actual attainment of the knowledge in question, or at least a certificate of genuine and presumably sufficient study.

III.—In proceeding to comment on the present conditions of candidature for the Medical Profession in this country, we first have to remind the Association that there does not yet exist, either by authority or by common consent, any one set of Regulations which can be cited as representing the national minimum of requirement in this matter; that, on the contrary, the nineteen different Corporations which give admission to the Medical Register (and in very great part only by half titles to general practice) act in virtual independence of one another, each with its own set of conditions; that, for instance, our London pupil, who would commonly purpose to procure, as his minimum title to general practice, the two semi-qualifications of the College of Surgeons and Apothecaries' Company respectively, or of the College of Surgeons and College of Physicians respectively, cannot find a set of conditions common even to his two co-qualifying Corporations, but must let his education advance, as it best can, under direction of two unassociated, not to say conflicting,

taskmasters. The above-described state of things is one which we regard with extreme regret and disapproval. We do not question the right of each Corporation to fix for itself any special conditions under which it will award such distinctive higher titles of honour, medical or surgical, as may be in its gift; but we think it self-evident that such titles ought only to be awardable to persons already registered, or entitled to be registered, in respect of having passed a minimum examination common to all departments of the Profession; and we hold it to be essential to any improved system of medical education, that the conditions of mere (minimum) admissibility to the Medical Register, both as regards examination itself, and as regards proofs of previous study, should not as now be different at different Examining Boards, and be in great degree variable at their separate option, but should be fixed from time to time, by the General Educational Authority, in one common code of regulations. To procure this simplicity of government for our Profession has been, for longer than living memory, the endeavour of all intelligent medical reformers, both primarily in order to a better conduct of medical education, and ulteriorly for the better fulfilment of our relations to the public: to promote its adoption was the main purpose with which the Medical Act of 1858, with its expensive consultative machinery, was advocated: and we think that our Medical Schools, no less than the general public, may reasonably complain that, ten years after the passing of the Act, the old chaos of rules and qualifications is still continuing as before.

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IV.—For the purposes of the present Report (written with particular reference to medical education in London) we may conveniently advert to the regulations of the College of Surgeons and Apothecaries' Company, as those which are of most practical influence, and as representing jointly the kind of law under which our profession has to be studied. The total of professional education to be required as minimum qualification from the candidate for general practice (excluding his so-called preliminary education) is distributed under

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eighteen different heads, strictly marked off from one another, and generally with a definite length of supposed teaching allotted to each:—(1) Anatomy by systematic lectures, (2) Anatomy by dissections, (3) Chemistry by systematic lectures, (4) Chemistry practically in laboratory, (5) Botany, (6) Physiology, (7) Materia Medica by systematic lectures, (8) Materia Medica by apprenticeship or otherwise as practical pharmacy, (9) Surgery by systematic lectures, (10) Surgery by hospital attendance and clinical lectures, (11) Surgery by acting as dresser or otherwise in charge of patients, (12) Medicine by systematic lectures, (13) Medicine by hospital attendance and clinical lectures, (14) Midwifery by systematic lectures, (15) Midwifery by attendance on cases, (16) Vaccination, (17) Morbid Anatomy, (18) Forensic Medicine. Under nine of these heads the student must be certified to have "attended" systematic courses of lectures of definite length, and in four of the nine to have "attended" the systematic courses twice over in successive years; also, in regard of hospital practice and clinical lectures, he must be certified to have attended during two years for medicine, and during two and a half years for surgery; his "instruction" in practical chemistry and "study" of practical pharmacy must each be certified to have been of three months' duration; and his midwifery cases and vaccinations must have been not less than 20. Certain of the subjects must be taught only from October to March inclusive, certain others only from May to July inclusive. Twice in each year the student must register at each of the two institutions his attendances on lectures and practice, and he must also have registered his studentship at the office of the General Medical Council. His schedule of certificates for the College of Surgeons has 19 separate sections, his schedule for the Apothecaries' Company has other 19: with only very small exceptions, all 38 must have been separately signed by teachers in "recognized Medical Schools;" and certificates as to the nine kinds of systematic lectures must have been given by at least eight different persons. As introductory to these detailed regulations, there are the following general rules, unfortunately

not identical for the two Licensing Corporations:—(1) that the candidate-apothecary must have been for five years an apothecary's apprentice, and have attended a medical school for three years; and (2) that the candidate-surgeon must have been for at least four years engaged in the acquirement of professional knowledge, and have attended a Medical School for at least two and a half years at the time. Each Board divides its examination into two parts: but the student is not in either case under any obligation to have an interval between the two parts of examination. Medical Teachers' Association Report.

V.—It seems to us that these Regulations are in general needlessly minute, and in some respects improperly stringent; and that, while in this sense they interfere objectionably with the freedom of those whom they affect, the elaborate machinery of Certificates and Registers, which purports to be their security for good education, is in itself as deceptive as it is troublesome. For the Certificates do not even professedly vouch for more than the mere bodily attendance of students on various occasions of teaching, and in reality (as the Licensing Boards are well aware) mean little or nothing else than that the student has paid such fees as have entitled him to attend the courses in question.

The excess of regulation is the essential evil. For of all the regulations it has to be remembered, that they relate not to ends, but only to means: not to the actual possession of knowledge (for which the appointed control is Examination) but only to modes in which knowledge may be acquired; and there can hardly be a greater fault in legislation than to over-multiply and over-magnify ordinances of this secondary sort. We hesitate to say that any such regulation ought to be universal; and those which we think may be almost universal are few and simple. As four well-employed years certainly represent the least time in which a young man of good ability, and with fair preliminary education, can moderately well acquire the knowledges which are now supposed to be learnt in the medical curriculum, so Examining Boards (if only to protect themselves against swarms of half-educated applicants) must almost necessarily require every candidate to give proof of thus much pro-

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fessional study; and as it is evident, with regard to the chief part of the knowledges, that practically they are not to be learnt except in certain properly constituted establishments, so it is no hardship on the student to require proof at his hands that his studies, for (say) three years of the time, have been in such an establishment: the responsibility of "recognising" which, as duly constituted for its purpose, must of necessity be vested in the authority which governs the education. Yet even in applying propositions of this great breadth, caution against over-stringent regulations is not superfluous. Every possible latitude of choice, consistent with the supposition of *bonâ fide* study, ought to be allowed as to modes and places of education. To insist unconditionally on attendance on systematic courses of lectures (to the ignoring of systematic reading and other modes of study by which the same sort of knowledge may be acquired) is, we think, wrong; and we are also of opinion that no student ought to be forced to learn in any specific establishment anything which he can reasonably be supposed able to learn elsewhere. Thus, if a student prefers to learn botany or chemistry elsewhere than in a Medical School, he ought, in our opinion, to be free to do so; and if he prefers to get his systematic view of surgery or materia medica by reading printed text-books of those subjects, rather than by having (so to speak) the same text-books read to him by lecturers, we see no reason why he should not be let act upon his option.

Similarly we are of opinion that neither the central Authority's power of withholding "recognition" from a Medical School, nor its power of making detailed requisitions from candidates for examination, ought ever to be so applied as to enforce that in indifferent matters all schools shall organise their teaching on the same pattern. In this point of view we object to the minuteness with which the present system insists on its particular subdivision of the subject-matters of medical teaching, and on the number of lectures to be given uninterchangeably under each of a great variety of heads, and on the giving of certain lectures only in one special part of the year, and so forth. We have already

suggested that very undue importance is attached to systematic courses, as contrasted with other modes in which knowledge may equally well be acquired; and a fixed general law that the same systematic courses must be attended twice over in successive years is, in our opinion, preposterous. Medical Teachers' Association Report.

It seems to us that central regulations tending to influence plans of education ought not to be conceived in this extremely narrow spirit; that such regulations cannot properly aim at more than to provide for the broad necessities of the case, including such few first principles of method as would universally be deemed right and important; that what remains beyond this (and doubtless very much does remain) is matter of internal school-discipline, to be dealt with by each school in its own way.

VI.—The only sort of regulation tending towards detail, which we think might be of universal application, would be to prevent as far as possible certain gross confusions of study. If the candidate is to be required to shew that he has spent at least four years in studying sciences and practice, it ought we think to be made incumbent on him to give his various proofs of study progressively, and at intervals, during that time. At present, in the case of a considerable proportion of students, the first year or eighteen months of the supposed four years of study may be spent in ways which it would be flattery to call educational; and then the very extensive and complex curriculum of the examining boards has virtually to be got through in three, or two and a half, years—a time so utterly insufficient for its professed purposes, that almost of necessity the student falls into inextricable confusion of thought, and emerges at length with but more or less smattering of the knowledges which he ought to have acquired. Regulations allotting particular studies to particular periods of studentship are useless unless they be enforced by such corresponding compulsory subdivisons of examination as shall ensure that the student learns in each period the matter which he is expected to learn; but, if so enforced, they represent in our opinion the best mode in which compulsory influences can be applied to details of

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medical education; and we are of opinion that compulsion of this sort, provided it be not too detailed, may very properly and expediently be made part of a code of general regulations. The various special knowledges which are at present required as minimum qualification for entering upon practice (in addition to the proofs of preliminary education) may be classified under three heads, as follows:—first, certain general scientific knowledge; second, anatomical and physiological knowledge; third, pathological and practical knowledge:—the first, as to botany, physics, chemistry, and, if the University of London is the examining board, zoology; the second, as to anatomy, topographical and structural, and physiology with physiological chemistry; the third, as to pathological anatomy, pathological chemistry, principles and practice of medicine, principles and practice of surgery, principles and practice of midwifery, pharmacy, forensic medicine. It would, we think, be a proper compulsory principle, that the student should not be allowed to count study in the second of these divisions till he had shewn himself proficient in the first, nor to count study in the third till he had shewn himself proficient in the second. Also the least number of years (say four) which a student is required to give to medical studies might so far be compulsorily allotted in divisions, that the third examination should not be permitted till two years after the second, nor the second till one year after the first.

Whether any general regulations beyond such as the above can conduce to the real success of medical education seems to us extremely doubtful. Any one who will consider, for instance, what total of subject-matter has to be treated under the two heads of anatomy and physiology, will see that the total might be very differently divided in two different schools, and yet be equally well taught in both. Still more, any one who will consider what total of subject-matter has to be taught under different heads of pathology and practice will see, first, that a division of systematic courses of lectures into the five sections of materia medica, medicine, surgery, midwifery, and forensic medicine, is by no means the only

division which could be deemed reasonable; and secondly, that even the total of systematic courses might be of very different magnitude in two different schools according as departments were more or less developed for various sections and subsections of clinical instruction, for practical pharmacy, for laboratory analysis, &c. &c. These are details in which it would seem best, not that all schools should be subject to one rigid rule, but rather that all should be as free as possible to choose the particular machinery wherewith honorably to compete for the character of giving good education. A well-manned school, put on its mettle, might be expected to improve very greatly on many present arrangements; especially by the lecturers concerting that their courses, both in extent and in succession of parts, should properly fit into one another, instead of being (as now) almost independent performances, with a vast deal of overlapping and repetition, and sometimes not a little mutual contradiction. Of the valuable suggestions recently made by Dr. Parkes for the improvement of medical education, many in our opinion are not suitable matter for universal central regulation, but are eminently such as might be realised in schools competing with one another under a system which should leave to them for all minor matters the largest possible amount of free action.

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VII.—If then we assume that the knowledges to be required from the candidate for minimum qualification in the profession are still to be, in kind, those which the present London regulations purport to require, our Curriculum, briefly stated, and subject to reasonable provision for exceptional cases, would be this. The examinations to be passed by the candidate would in all be at least four in number;—first, in common preliminary education; second, in preliminary scientific education—the chemistry, physics, botany and zoology, of the present system; third, in anatomy and physiology; fourth (which might perhaps have to be sub-divided) materia medica, pathology, forensic medicine, and the several departments of practice. To the fourth examination he would not be admissible till at least two years after the third, nor to the third till at least one year

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after the second, nor to the second till at least one year after the first. Thus his four years would have been used methodically. To at least the first and second examinations he would be admissible on the principle of "free student-"ship"—*i.e.* without being required to adduce evidence of having learnt in any particular way, or in any particular establishment. Chemistry and physics, botany and zoology, would in this respect be on the same footing as English and Latin and arithmetic. For admissibility to the third examination he would have to produce a certificate from "recognised" teachers that he had for at least one year, since the date of his second pass, studied anatomy and physiology under their direction, according to the method of their school, and had done so to their satisfaction. Similarly, for admissibility to the fourth examination, he would have to produce a certificate from "recognised" teachers that he had for two years, since his third pass, studied pathology and the several branches of practice under their direction, according to the method of their school, and had done so to their satisfaction; and for this examination he would also have to shew that he had attained the age for legal responsibility. Whether the final examination should, to complete it, involve some sort of recapitulatory examination in matters of previous passes, is *à priori* doubtful; but we incline to recommend that at any rate it should not generally do so with the minuteness of the original examinations.

VIII.—Securities for the proper working of such a system as the above may be looked for in three different directions: first, namely, in the guardedness of "recognition;" second, in the efficiency and strictness of examining boards; third, in the legitimate competition of schools: but it is on the second and third of these influences, and especially on their conjoint operation, that we would almost unreservedly rely. Each of the three points, however, requires to be separately considered.

1. As regards the "recognition" of schools, we have already suggested that this discretion ought to be vested in the General Educational Authority, rather than in a number of unconnected Corporations, and we would wish to see it

exercised in the most liberal spirit. We of course know that, if schools are over-numerous, those who conduct them must be proportionately ill-paid; but any direct restriction of numbers is impossible as regards the claimants of recognition, and to attempt it would contravene first principles of public policy. The only right and possible restriction on numbers is to make sure by indirect ways that ill-conducted schools shall not be commercially profitable: for, if this result can be attained, such schools will have no inducement to arise, and the supply of good schools will numerically adjust itself to the demand. In this respect it would be a great gain that compulsory regulations should not, as now, artificially force the multiplication of lectureships. And though Mr. Rivington's proposal, that certain branches of the curriculum should not be taught in separate medical schools but only in one central establishment, is of a sort which in our opinion lies far beyond the province of direct regulation, we would gladly see schools left in greater freedom than they virtually now have, to make such voluntary arrangements as would tend more or less completely to realise Mr. Rivington's object. We would propose that the recognisability of medical schools should be in divisions corresponding to the divisions of examination,—that a school should be recognisable as a School of Pathology and Practice, or as a School of Anatomy and Physiology, or as both. A school applying for recognition in either capacity, or in both, would have to shew itself, to the satisfaction of the Authority, possessed of all requisite means and organisation for properly teaching whatever it claimed to teach; and the Authority would also have to see, in some detail, that the instructional programme of the school thoroughly covered the ground in which students would be entitled to expect instruction. Some establishments might care only to act in one or both of the strictly medical capacities, for which alone "recognition" would be necessary; but others, at their own option, might also have their respective sections of preliminary science, which, for obvious reasons, if they were well-conducted, would no doubt still (though without compulsion) be the almost invariable resort of first year's students; and finally some

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few establishments (as is now the case with King's and University Colleges) might happen also to have common preliminary education attainable within the same walls as the scientific and technical education.

2. The most important aspect of the question of medical education is not as to the forms and processes which candidates shall go through, but as to the intellectual fruits which they shall ripen; for the forms and processes will sooner or later regulate and adapt themselves, to secure whatever results must be attained as the end and aim of the curriculum. These (broadly speaking) are such results as shall satisfy certain examiners: and whether the process of education truly gives fruit according to its programme, whether the knowledges nominally claimable of the student are knowledges really acquired by him, is an issue which will be mainly contingent on the mode in which examinations are conducted. We therefore cannot too strongly express our opinion that a lax or incompetent administration of this great trust is among the most grievous wrongs which can be inflicted on our profession and the public. Not only with reference to the ultimate aim of securing in the public interests that only well-qualified candidates shall recruit the ranks of our profession, but equally with reference to the mediate aim (now specially under our notice) of securing that medical schools shall be well-conducted, it is, in our opinion, of the very first urgency that nothing approaching to inefficiency should be tolerated in any Board of Examiners. Especially too the reforms which we advocate depend so very much for their possibility on the confidence with which examinations can be regarded as adequate tests of education, that we are forced to insist on this point. We cannot conceive that public interests are properly cared for, where large permanent Boards, with no distribution of subject-matter, conduct their whole range of examination equally by all their members: believing, as we do, that every subject which ought to be separately taught ought also to be separately examined in, and that the examiner in each subject should represent as far as possible the very best special knowledge of the time.

And we also think it very important that examiners should as far as possible be so appointed as not to have any pecuniary interest in the number of accepted candidates. Medical Teachers' Association Report.

Here too we have to add another important qualification. We are of opinion that the controlling Authority ought to define with very much more precision than is now used, within what area of knowledge candidates for minimum qualification are to be examined,—to what exact extent in chemistry, to what exact extent in physiology, to what exact extent in forensic medicine, and so forth. We would insist that examinations should be thoroughly searching and strict within the area to which they purport to extend; and it is in order to this object that the examiner's requisition of knowledge should in the first instance be well defined. The present programme, unless it be understood with modifications which are not expressed in it, is, we think, too pretentious for its object. We cannot hope (much as we might wish) that every one entering upon practice in the United Kingdom shall have thoroughly mastered all the studies which are now nominally comprised in his curriculum,—all the botany, physics and chemistry, all the anatomy and physiology, all the forensic medicine and pharmacology, &c.; but if the requisition of the examining Authority in regard of each such subject-matter were defined in the manner we suggest, a really thorough knowledge within that more limited area might, we think, be made indispensable, and very advantageously be substituted for smatterings of larger pretension.

3. Subject to the above qualifications, we may now complete our scheme of securities. Schools, constituted as we have described, would be at liberty, under the described conditions, to present their students for examination: and the legitimate competition of schools—competition, namely, as to which of them shall shew the best educational results, is the influence which remains to be provided for. The course which in this respect ought in our opinion to be taken, is to provide that returns from all Examining Boards should annually be made to the general Authority, and by this Authority be published: stating, with all such particulars as might conduce to exact comparison, what had been the

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proportions of pluck and pass in each class of candidates sent up by the several schools respectively. The public would thus have the best attainable means for forming its own conclusions as to the relative efficiency of each school; and as those conclusions would certainly in the main determine the prosperity of the school, so the interest of the teachers would be very directly identified with the merits of their system of teaching. And thus, in our opinion, Medical Education would be far more likely to improve than under a continuance of the present illusory regulations.

IX.—In concluding our Report it is perhaps desirable for us expressly to point out that the conditions of qualification to which it refers are exclusively those of minimum qualification for the Profession, and that we therefore do not pretend to have exhausted the subject of medical education. We, on the contrary, think it incalculably important that persons entering the Profession should to the utmost be moved by adequate inducements to continue their education far beyond the comparatively low point at which a standard of minimum qualification must be fixed; and in this point of view the conditions under which the various Corporations confer their higher titular distinctions, seems to us only of less public interest than the conditions of minimum qualification. It would, however, be beyond the limits of our commission to enter upon this subject, or to discuss educational provisions (such as of course every first-class school ought to contain) for licentiates who wish thus to extend their studies. And we only advert here to those branches of the general subject, lest it should in any degree be supposed that we have been unmindful of their great importance.

J. S.

June 26th, 1868.

THE PRACTICE OF PHARMACY IN GREAT BRITAIN.

THE PRACTICE OF PHARMACY IN GREAT BRITAIN.

ACCIDENTAL AND CRIMINAL POISONING.

From the Sixth Report to the Privy Council, 1863.

[The following extract from the Sixth Report is inserted here for convenience of reference, the evils described having led up to the Pharmacy Act of 1868.—Ed.]

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To what extent the administration of poison causes death or disease in England is not even approximately known. From the Registrar General's last Annual Report it appears that during the four years 1858-61, 1,059 deaths by accidental poisoning, and 509 deaths by voluntary self-poisoning, were returned to him as certified. And during the same four years there were also certified 1,380 murders, of which no doubt a considerable, though not ascertained, proportion was due to poison. But evidently it would be erroneous to infer from these figures that poison does not in England prove fatal to more than from four to five hundred persons per annum. The list of deaths by poison is at best only the list of the fatal poisonings which are discovered. But here is a cause of death which is peculiarly apt to be undiscovered. For the murderous poisoner of course plans not to be found out. And the accidental poisoner—the careless dispenser, for instance, who supplies a poison instead of an innocent medicine, is at first unaware of his mistake, and may perhaps never be made aware of it. Further, as regards the victim himself,—poisons which make no decided impression on the mouth or palate may be swallowed quite unconsciously of harm, and their effects may then be confounded with symptoms of ordinary disease. And thus, in various ways, whether the administration of poison have been accidental or felonious, the essential circumstances of the case may easily be such that suspicion is not aroused as to the real cause of the illness.

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Both with reference to the number of cases in which poison is recognised to be the cause of death, and with reference to the doubt whether perhaps many other deaths are, without discovery, caused by poison, my Lords have deemed it important to consider what security the public enjoys against an indefinite multiplication of such cases. And in order to the consideration of this question, I under their Lordships' orders requested Dr. Alfred Taylor to report, from his large experience, what, in his judgment, is the present degree of the insecurity ;—viz., (1) to what extent is injury occasioned by the carelessness and incompetence of persons employed in retailing drugs ;—and (2) to what extent are unnecessary facilities given for the purchase of poison for criminal purposes.

Dr. Taylor's report points in both respects to a most unsatisfactory state of things.

First, as regards the facility with which poison may be obtained for criminal purposes,—Dr. Taylor sums up the case by stating that "so long as a person of any age has the com- "mand of threepence, he can procure for this sum a sufficient "quantity of one of the most deadly poisons to destroy the "lives of two adults ... No one wishing to destroy another "by poison, and having the knowledge to make a selection "among drugs, can meet with any difficulty in carrying out "his design. If refused at one shop, he can procure the "poison at another. If refused by a druggist, he can procure "it at a grocer's. If refused at a grocer's, he can procure it "at a village general shop, where poisons are retailed by girls "and boys, and no questions are asked .... In the course of "more than 30 years' experience in investigating charges of "poisoning, I have met with a large number of cases in which "murder and suicide have been perpetrated or attempted, as "a result of the dangerous facilities which exist for the pur- "chase of poisons."

One particular poison has indeed been the subject of legislation. Under 14th and 15th Vict., cap. 13, arsenic (in quantity under 10 pounds) ought not to be sold otherwise than coloured with soot or indigo,—nor except with full registration of the buyer's name and residence, and of the time, quantity, and professed purpose of his buying,—nor, even thus,

to any person unknown to the seller, unless it be in presence of a witness known to both buyer and seller. But, says Dr. Taylor, "in several cases of criminal poisoning (two occurring in 1863) which I have been required to investigate, involving charges of murder, uncoloured or white arsenic has been used as the instrument of death. Its great cheapness (one penny to twopence an ounce) places it within the reach of the poorest person. It is sold to any applicant on the most frivolous pretences; and even in the coloured state it affords but little protection, except when it is mixed with liquids. The better class of druggists do not sell arsenic by retail; the grocer, chandler, oilman, and village shopkeeper are the principal vendors of this poison; and it is clear from the numerous deaths which take place from white arsenic that they set the law at defiance, and sell the poison in an uncoloured state, in which case it may be readily administered in any article of food, without exciting suspicion." Accidental and criminal poisoning.

With the sale of other poisons there is not even nominal statutory interference. And whether they are wanted for murder, or for suicide, or for the procuring of abortion, the facilities are such as Dr. Taylor describes;—for though doubtless druggists of the best class are extremely chary of selling poisons, yet, says Dr. Taylor, "the lower class of drug-dealers, including grocers, oilmen, and the general shopkeepers of villages, have no such scruples; and although, if we except strychnia, many of the more potent poisons are not found in their shops, they have still a sufficient number of noxious drugs to endanger health and life, by reason of the facility with which they dispose of them to the public."

Secondly, as regards the ordinary business of retail druggists in dispensing and vending medicines,—Dr. Taylor testifies to the frequent employment of entirely unskilled and heedless persons in this business, and to the mischief which results from the incompetence or slovenliness of such persons;—how "a large number of persons wholly unacquainted with the properties of powerful drugs and medicines are allowed to retail them to the public, on demand, without any check or control;"—how "persons who have had no professional education as druggists, and acting as oilmen, grocers, or

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" village shopkeepers, keep for sale laudanum, tincture of " rhubarb, senna, black draughts, &c., and either from careless- " ness in placing the bottles containing these medicines near " to each other, or from ignorance, supply laudanum for the " tinctures above mentioned, and thus either injure health or " destroy life;"—how, for instance, opium and its tincture have often been given in mistake for rhubarb and its tincture, —how oxalic acid and other poisons have again and again been given for Epsom salts,—how chloride of zinc has on several occasions been given for fluid magnesia,—how arsenic has been given instead of calomel and instead of magnesia,— and so forth. In part-explanation of these lamentable accidents, Dr. Taylor points out that the natural results of incompetence and gross ignorance on the part of those who are allowed to retail drugs to the public " are increased a hun- " dred-fold by reason of the carelessness displayed in " keeping innocent medicines and poisonous compounds re- " sembling each other on shelves or drawers in close prox- " imity." Thus, in the shops of ordinary druggists, tincture of opium and tincture of senna and tincture of rhubarb, like one another in colour, may be standing side by side on a shelf, in bottles of like size and shape, and with labels which, if only half-read, seem identical. Or strychnine may be side by side with jalapine, morphia, salicine, quinine;—and " cases have " come to my knowledge," says Dr. Taylor, " where strychnine " has thus been dispensed by mistake, and has caused death." But the greatest dimensions of this particular danger,—dimensions, in fact, which are almost incredible,—are reached in the general shops of country villages, where draperies and groceries and drugs and poisons are all sold, and where perhaps even foods and poisons are not kept well asunder. From shops of this description (in cases which Dr. Taylor quotes from among various instances known to him), arrowroot, rice, oatmeal, or something else in common demand, has reached its purchaser with a fatal admixture of arsenic. And in one such case (where arsenic had been given instead of arrowroot, and had of course killed the consumer) a witness who " went to " the shop after the accident to make inquiries, found rice, " corrosive sublimate, jalap, and oxalic acid in different papers

" in the same drawer, and all under the care of an ignorant " boy."

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And, beyond the limits of the petty village-shopkeeping, the careless custody of poisons leads sometimes to their being sold for other matters, and used, even on a larger scale, accordingly;—orpiment (arsenical yellow) sold instead of the milder poison of chrome yellow, or instead of turmeric, or instead of mustard, and used as turmeric to colour buns,—or 12 lbs. of white arsenic sold instead of 12 lbs. of plaster of Paris, and used in this supposed capacity to adulterate lozenges,—or 30 lbs. of sugar of lead sent (perhaps instead of alum) to a miller's, and used for admixture with 80 sacks of flour. Dr. Taylor gives cases where occurrences such as these have led to wholesale poisoning;—the Bradford case, for instance, where arsenical lozenges killed 17 persons and severely injured 183 others,—and the Stourbridge case, where, some years since, under the circumstances I have just described, no fewer than 500 persons were more or less affected (none fatally, but some with great severity) by the poisoning of their bread with lead. And in illustration, not necessarily of the mistaken sale, but assuredly of the most wanton and reckless use of a poison, he describes how, seven years ago, the 340 children of the Norwood school took with their morning milk-and-water about one grain of arsenic each, and suffered of course sharp symptoms of arsenical poisoning, in consequence of a workman's having left in the boiler which he was employed to clean as much arsenite of soda as contained about nine pounds of arsenic. " Fortunately [and this accident saved 340 lives] " only four gallons of the poisoned water were drawn from " the boiler on the following morning. Each child had taken " a quantity just within the fatal dose of arsenic."

I venture to submit that the above-described state of things deserves the particular consideration of Parliament. For the unrestrictedness with which at present the retail trade in drugs and poisons is conducted, confers, in a curious way and to an extent which could scarcely have been foreseen, irresponsibility even for mischievous acts. Apparently the view which the legislature has taken of the matter has been,

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that the trade might safely be left unshackled by special regulations, and open without special licence to all who choose to undertake its practice;—for that the common law would suffice to protect the public by punishing any druggist who by his own incompetence or carelessness, or by the employment of an incompetent or careless agent, should have caused any personal harm. But the view taken by the administrators of the law has not corresponded with that supposed view of the legislature, and the absence of special enactment on the subject seems in most instances to be accepted as a ground for concluding that a druggist's carelessness and malpractice, however extreme in degree, and however fatal in result, are not in the eye of the law criminal carelessness and malpractice. Thus, in nearly all the scandalous cases which Dr. Taylor describes, the tradesman whose ill-conducted business led to loss or endangerment of life escaped with absolute impunity. "In nearly all cases which are the subject of inquests or trials "for manslaughter, it will be observed that proof of *negligence* "is not sufficient; the proof must amount to *gross* or *culpable* "negligence in law, or the wrongdoer will escape. What "gross or culpable negligence is has not yet been defined, but "we learn from the verdicts of juries that the keeping of "poisons and medicines similar in appearance on the same "shelf close to each other is not gross negligence! So the "selling of oxalic acid or nitre for Epsom salts, and the keeping of these substances in contiguous drawers or packets, "unlabelled until the time of sale, and then labelling the "poison as an innocent medicine, does not constitute culpable "negligence! The employment of youths of no experience in "drugs, who cannot distinguish arsenic from calomel, magnesia, or plaster of Paris, or powdered opium from powdered "rhubarb, or laudanum from tincture of rhubarb,—furnish, "by the destruction of life, merely illustrations of unavoidable accident or misadventure, and not of gross negligence "on the part of an employer!" Even in the Bradford case, where, in 1858–9, 200 persons were poisoned, and seventeen of them fatally, through the sale of arsenic for plaster of Paris, it was ruled that no legal carelessness had been committed,—no legal carelessness, though arsenic and plaster of Paris were

kept in similar casks side by side, in a loft, with no evident label upon either of them,—no legal carelessness, though a boy who had but three weeks' experience in the shop was sent to choose between these imperfectly distinguished casks,—no legal carelessness, though the stuff which he brought down was given without the master's examination to the man who was waiting to make it into lozenges. Evidently this state of things implies more than the legislature can mean to sanction:—it implies not merely that the right-doing druggist shall be free from interference, but that the wrong-doing druggist shall be almost secure from punishment. Accidental and criminal poisoning.

Dr. Taylor concludes his report with suggestions which deserve to have much weight, as to the reforms which are desirable in the conduct of pharmaceutical business. His fundamental opinion, that poisons, and medicines likely to act as poisons, ought not to be sold in retail except by properly educated persons, and under some other reasonable restrictions as regards both seller and purchaser, is an opinion which I submit for consideration, as one in which I entirely concur. And it seems to me that this object might be attained without giving the drug-trade any reasonable ground of complaint, and without inconveniencing the public as regards the purchasability of non-poisonous drugs. Facilities might be given to druggists to divide themselves into an upper and a lower class. At first such a division might be made by an enactment constituting into an upper class all who had previously passed an examination as pharmaceutical chemists or as apothecaries; perhaps with the further addition of all who at the time of the making of the enactment should be in bonâ fide practice as druggists on their own account, provided their trade as druggists were conducted separately from all other trade;—and subsequently to the first constitution of this upper class, admission into it might be obtained on examination before some appointed authority or authorities. To persons of this class (but with express exclusion of general shopkeepers) the office of selling poisons might be restricted. And the purchasability of poisons by the public might at the same time be made effectually subject to the rule which now ineffectually relates to the purchase of arsenic;—that no such

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sale shall be made except with full registration of the buyer's name and residence, and of the time, quantity, and proposed purpose of his buying,—nor, even thus, to any person unknown to the seller unless in presence of a witness acquainted with both seller and buyer. But whether or not provisions like these may seem to the legislature fit and proper for enactment, I must submit that, with or without such enactments, one particular act of legislation is urgently wanted in the matter;—an act, namely, which, either by its own language, or by empowering some department of the Government to make regulations in the matter, shall directly or indirectly provide for the establishment of a legal criterion as to what is *culpable carelessness* in the sale of drugs and poisons, and shall thus render every such carelessness an offence punishable at law.

Before closing this section of my report, I beg leave to bring under particular notice, as connected with the present subject—first, the statements which, in relation to manufacturing towns,* I submitted two years ago concerning the destructive practice of drugging infants with opium, and, secondly, the statements which are contained in Dr. Hunter's report concerning the use of opium in our principal marsh districts. "There can (says "Dr. Hunter) be no doubt of the truth of the horrid statement "made by almost every surgeon in the marsh land, that there "was not a labourer's house in which the bottle of opiate was "not to be seen, and not a child but who got it in some form. "In other counties, where women work away from home, as "in the factory towns, the children are drugged by the nurses, "and one need not be surprised to find the same plan adopted "here; but other circumstances combine to render it a com-"mon practice to push this drugging system to an extent "known only in the districts in question. The painful "rheumatisms and neuralgia which still continue to be com-"mon in the fens [i.e. among elder persons, but probably "without any suspicion that the infants suffer from them] "have been generally treated by the free use of opium, and "with this drug the whole people have become thoroughly "familiar. The wholesale druggists report that they send "immense quantities to these counties, and the retail druggists

* Fourth Report to the Privy Council, Vol. II. pp. 55–59.

" often dispense so much as 200 lbs. a year.* It is sold " in pills or penny sticks, and a well-accustomed shop will " serve 300 or 400 customers with the article on a Saturday " night. The druggists thought their largest consumers were " not the villagers, or people of the little town in which the " shop was, but rather the inhabitants of small hamlets or " isolated farms in the fens. Opium is often asked for under " some cant name, and the idea of it is as of a forbidden jollity. " The quantity which an old opium eater will take has often " been reported (about half an ounce a day is common) and " finds its limit rather in the cost than in the strength of the " drug. A man in South Lincolnshire complained that his " wife had spent 100*l.* in opium since he married. A man " may be seen occasionally asleep in a field leaning on his hoe. " He starts when approached, and works vigorously for a " while. A man who is setting about a hard job takes his " pill as a preliminary, and many never take their beer with- " out dropping a piece of opium into it. To meet the popular " taste, but to the extreme inconvenience of strangers, narco- " tic agents are put into the beer by the brewers or sellers. " Half a century ago the growth of poppies for the London " drug market was conducted in this light land. Then the " husbandman took poppy drink with him to the field; and " now, although the cultivation of the article for sale is almost " abandoned, the poppy capsule forms the principal ingredient

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* Dr. Thudichum gives me the following curious information as to the quantity of opium annually sold at one country town in Lincolnshire :—" Seven " druggists in the town of Spalding sell 27 stones 3½ lbs. of opium, partly in the " form of laudanum. There are 21,000 souls in the town and district of " Spalding (last Census) supplied by these druggists. This gives a con- " sumption of opium of 127 grains per head per annum. A small portion of the " opium is used for sheep during lambing season. Allowing the 27 grains of " every 127 to cover that purpose, which is probably an excessive estimate, " there remains the startling circumstance that the consumption of opium in the " Spalding district amounts to about 100 grains per individual of the population " per annum. The opium is used for eating by adults, and for drugging infants. " Infant mortality in that district is 21,845, while in all England it was 17,731 " out of 100,000 living. The population of Spalding was decreased during the " last 10 years. The above quantity of opium does not include the opium used " by medical practitioners. The data regarding the quantities of opium sold " at Spalding have been collected by Dr. E. Morris of Spalding, and commu- " nicated to me."—J.S.

Accidental and criminal poisoning.

" of the herb teas and domestic medicines of the neighbour-
" hood. With such familiarity with the drug, no wonder that
" every one is ready to use it to quiet a crying child, though
" only to ensure its crying again as soon as awake. Opium
" eaters are said to be always proselytizers, and will even
" give a child opium behind the back of the mother or nurse.
" The favourite form for infants is called Godfrey's Cordial, a
" mixture of opium, treacle, and infusion of sassafras. This
" is thickish, and is often fetched in a teacup. When
" the mother going to field work deposits her child with a
" nurse, she thinks it best to leave her own bottle of Godfrey,
" because the preparations of the different shops vary, and
" there is not a little village shop in the country that sells
" anything that does not sell its own Godfrey. To push the
" sale of opiates in these little shops is the great aim of some
" enterprising wholesale merchants. By druggists it is con-
" sidered 'the leading article,' and the profit on it is small
" when sold in a crude state. It has not unfrequently hap-
" pened that a nurse has substituted her own Godfrey for her
" client's, and, frightened at its effects, has summoned the
" surgeon, who finds half a dozen babies, some snoring, some
" squinting, all pallid and eye-sunken, lying about the room,
" all poisoned."

THE PHARMACY ACT, 1868.

From the Eleventh Report to the Privy Council, 1868.

Pharmacy Act, 1868.

An important addition to the sanitary law of the country was made last year by the passing of the Pharmacy Act, 1868. This statute is chiefly directed against evils to which I particularly drew attention in my sixth report, as attaching to the practice of pharmacy by unqualified persons, and to the too unrestricted procurability of poison for criminal purposes. The new law is to be worked by the Pharmaceutical Society, under the general sanction and supervision of my Lords of the Privy Council. It provides that in future no one shall

begin any such pharmaceutical practice as involves a sale of poisons, unless he have first passed a sufficient examination in pharmaceutical knowledge; and that poisons shall not be purchaseable except with such personal identification as would probably hamper anyone who intended to make criminal use of them; and that the keeping and sale of poisons generally shall be subject to regulation under the Act. It also affirms an important principle in regard of the adulteration of drugs, by enacting that the provisions of the Adulteration of Food Act of 1860 shall be extended, mutatis mutandis, to the sale of drugs. Pharmacy Act, 1868.

THE PRACTICE OF PHARMACY IN GREAT BRITAIN.

From the Twelfth Report to the Privy Council, 1869.

Under the Pharmacy Act, 1868, which makes the Pharmaceutical Society a licensing and regulating body for the business of chemists and druggists in England and Scotland, certain responsibilities of sanction and supervision are assigned to the Lords of the Council: the bye-laws of the Society, and its appointment of examiners, and its resolutions and regulations concerning poisons, having, before they can become valid, to receive the approval of the Privy Council: while also, in order that the public may be certified of the sufficiency of the Society's examinations for license under the Act, my Lords are authorised to have present at any examination of candidates any person whom they may appoint for the purpose. Practice of Pharmacy.

1. In 1869, under the provisions above referred to, the Pharmaceutical Society submitted for their Lordships' approval a system of consolidated and amended bye-laws, partly repeating former bye-laws which the Secretary of State under the Act of 1852 had approved, partly proposing various alterations and additions which the changed relations of the Society rendered expedient; and these bye-laws (some of the sections of which fix the conditions of qualification and the Byelaws of Pharmaceutical Society.

Byelaws of Pharmaceutical Society.

machinery of examination for admission to pharmaceutical practice in the United Kingdom) received their Lordships' approval. The annual list of examiners for the purposes of the Act was also submitted by the Society and approved by my Lords.

Poisons under the Pharmacy Act.

2. Under section second of the Act, my Lords confirmed a resolution of the Society making some important additions to the list of things enumerated in Schedule A of the Act, to be accounted "poisons" under the Act. I subjoin the schedule of "poisons" as it now stands, extended by the above confirmed resolutions. Appendix.

Examinations of candidates for Pharmaceutical practice.

3. Under section six of the Act, the examinations of the Society were visited, for their Lordships' information, in London on eight occasions by Dr. Greenhow, and in Scotland on three occasions by Professor Christison; and the subjoined reports on the examinations (Appendix) were furnished at the end of the year by the visitors. It had long been a desideratum in Great Britain as regards the practice of Pharmacy, that this skilled commerce, where unskilfulness means very serious danger to the public health, should only be open to persons whose qualifications for safely practising it had been tested by proper examination; and the appended reports appear to me to give ground for much public satisfaction, as showing that the system which the Pharmacy Act of 1868 brought into operation provides adequate security to that very important effect.

Adulteration of drugs.

4. One most important section of the Act has, I fear, hitherto not borne fruit. The Act, in its 24th section, enacts that the provisions of the Adulteration of Food Act shall extend to the adulteration of drugs, and that every such adulteration shall be deemed an admixture dangerous to health. So far as my knowledge goes, this section has not yet been acted on. Indeed, seeing that the Adulteration of Food Act is virtually a dead letter, no one could have expected that this extension of it would be very effective. There is, however, cause for congratulation in the fact that a principle of great public importance has in that section been affirmed by the Legislature. The falsification of drugs is a crime which, in the interests of the public health, ought to be very severely

punishable, and very vigilantly looked after; for, as I need hardly observe, it so frustrates the best medical skill, and may so cheat away life after life, that it is really a kind of secret poisoning. I do not propose now to dwell on the subject; for, in the present state of the law, with so many first necessities for the health of the country unfulfilled, and with such great masses of fundamental sanitary law to be amended or created, it may scarcely be expected that this particular grievance can be matter for immediate legislation. So far, however, as the inoperativeness of the adulteration laws results from defects of administrative machinery, I would beg leave to refer to the remarks which in my last report I submitted on the kind of local authority which in my opinion is greatly needed to protect the public health against this and other varieties of commercial wrong.

Adulteration of drugs.

5. I also regret to state that the very important power which the first section of the Act vests in the Pharmaceutical Society, to prescribe (with the consent of the Privy Council) regulations as to the keeping, dispensing, and selling, of poisons, has hitherto remained unexercised by the Society; and that consequently the public is still without the protection which such regulations might give, and which notoriously is much needed, against the danger of having poisons dispensed or used in mistake for harmless preparations.

Regulations concerning poisons.

From the Thirteenth Report to the Privy Council, 1870.

Under the provisions of the *Pharmacy Act*, 1868, described in my last year's report, I conveyed to the Pharmaceutical Society, in 1870, your Lordships' approval of the Society's annual list of examiners for the purposes of the Act, and have now to submit to your Lordships the satisfactory report made by Dr. Greenhow on the London examinations of the Society in 1870, as visited by him for your Lordships' information. (Appendix.)

The practice of Pharmacy in Great Britain.

I regret to report to your Lordships that the power which, for the public protection, the first section of the Act vests in

Practice of Pharmacy in Great Britain.

the Pharmaceutical Society, to prescribe (with consent of the Privy Council) regulations as to the keeping, dispensing, and selling of poisons, is still entirely unexercised. I believe it to have been by an accidental oversight in legislation, that, while all other powers to be exercised for public purposes by the Society under the Act were vested in the Council of the Society, the language of the first section vested in the Commonalty, and not in the Council, the very important power which that section confers, and to which my present observations relate. It is perhaps not surprising that a large body of tradesmen should be slow to take the initiative in imposing even the most reasonable penal restrictions on themselves: but I have to submit to your Lordships, as a fact which you may deem deserving the consideration of Parliament, that this non-fulfilment of the Society's duty, to make rules against dangerous slovenliness in the keeping, dispensing, and selling of poisons, is a breach of the implied contract under which the Legislature in 1868 gave powers and privileges to the Society.

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